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ABSTRACT

This manual is designed to help state and regional water supply training personnel conduct seminars for instructors of water plant operators. The purpose is to help state supervisors upgrade the quality of training given to the plant operators by their instructors. Since a survey indicated that operator training instructors are technically competent, the focus is on training rather than content or operating skills. Section I outlines the procedures involved in planning a seminar for operator training instructors, describes the task of an instructor, and provides an overview of the seminar, forms and questionnaires, and agendas. Section II contains 13 complete lesson plans, each of which has three parts, lesson plan cover sheets, and instructional material. Eight of the lessons address the development and preparation of a good training program including content, objectives, methods, and preparing lesson plans. Five lessons focus on classroom delivery techniques such as group discussion and demonstration. (DC)

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United States
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Washington, DC 20450

August 1979

Water

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Instructor Training Seminars

A Manual for State Training Supervisors

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INSTRUCTOR TRAINING SEMINARS

A MANUAL FOR STATE TRAINING SUPERVISORS

Prepared for:

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Washington, D. C. 20460

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August 1979

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SECTION I

PLANNING INSTRUCTOR TRAINING SEMINARS

SECTION I. PLANNING INSTRUCTOR TRAINING SEMINARS

Introduction

Background

In the fall of 1978, the Office of Drinking Water of the Environmental Protection Agency (EPA) contracted with Applied Science Associates, Inc., (ASA) to develop a one-week training program for state and regional water supply training personnel. The resulting program, the Instructor Development Workshop (IDW) was designed to extend existing state training personnel skills and knowledges in the areas of training development and classroom teaching techniques. In the course of the IDW, participants from 23 states gained first-hand experience developing and presenting a one-day instructional techniques seminar to local instructors of water plant operator training courses.

On the basis of their experience, the majority of IDW participants expressed the willingness and desire to conduct similar training seminars in their home states. However, many participants expressed their concern over having sufficient time to prepare instructional materials necessary for conducting such seminars. This manual has been prepared to provide persons who have operator training instructors under their supervision, e.g., state training officers, with the basic instructional materials needed to meet the common training needs of their instructors. The ultimate purpose of this manual is to assist the training supervisor in upgrading the quality of operator training by providing instructor training to his/her instructors.

This manual is divided into two sections. Section I describes the general procedures involved in planning one or more seminars for operator training instructors. Section II provides complete lesson plans and training materials necessary for the actual conduct of instructor training seminars.

Overview of Seminar Planning

Research has indicated that effective training is the result of good planning and the application of a number of simple training development principles. You can provide effective instructor training by:

1. Knowing what an instructor actually must do to be considered a good instructor.
2. Identifying the training needs of instructors under your supervision.
3. Selecting the lessons from Section II of this manual which best meet the needs of your instructors.

The remainder of this section will describe these procedures for planning effective instructor training.

Instructor Tasks

Being a good instructor for operator training course is a complex job, involving a number of tasks. The instructor must, of course, possess the technical content expertise regarding water plant operation before he or she can be expected to perform adequately as an instructor. Reports from a sample of 26 states across the country indicate that the majority of operator training instructors are technically qualified in the area of water plant operation. In fact, most instructors have been employed because of their expertise in this area. The majority may be considered subject matter experts in the area of water treatment. For that reason, the instructional materials in this manual do not address any of the technical aspects of water treatment.

But a good instructor must be more than technically knowledgeable. A good instructor must also:

1. Decide what information the training audience needs and requires.
2. Organize and prepare instructional materials in such a way as to optimize trainee learning and the trainee's motivation to learn.
3. Present developed instruction in the classroom in a way that assures that the trainees learn.
4. Determine whether trainees are learning, and what steps can be taken when they are not.

By this description, a good instructor must not only be technically knowledgeable, but must also be able to organize and prepare instructional activities that will transmit this knowledge, and competently deliver prepared materials in the classroom. For the good instructor, the goal of all lesson preparation and classroom activities is optimization of trainee learning.

While the 1978 survey showed that most operator training instructors are technically competent, these data also indicate that only a small portion of these instructors have had any formalized training in the areas of training development or classroom presentation techniques. The materials contained in this manual have been designed to fill instructor needs in these two general areas. Specifically, lesson plans are provided for each of thirteen topic areas presented in Section II of this manual. The first eight lesson plans address the development and preparation of a good training program. The last five lesson plans address classroom delivery techniques. The title of each lesson is presented in Table 1, along with a brief description of its content and scope.

Table 1

Lesson Descriptions

LESSON 1. Determining training content.

This lesson covers the three general steps to be taken in determining the content of any training program, regardless of whether the program is to be two weeks or one-hour long. These are: (a) analyzing a job into specific tasks, (b) deriving the skills and knowledges required to perform those tasks, and (c) identifying those areas in which a training audience is weak with respect to the required skills and knowledges.

LESSON 2. Writing useful training objectives.

The purpose of this lesson is to explain the steps involved in writing performance-based objectives for the trainee to accomplish, as opposed to objectives that describe what an instructor does in class. Emphasis is placed on the procedures for writing good training objectives. This lesson, a portion of which is self-instructional, provides practice exercises in recognizing and writing performance-based objectives.

LESSON 3. Sources of operator training materials.

This lesson lists and describes numerous sources of operator training materials and focuses on the services provided by EPA through the National Technology and Operations Training Center in Cincinnati, Ohio. Procedures are discussed for accessing audio-visuals, including slide/tape, film, and video tape instructional programs, as well as completed training units of relevance to water plant operation.

LESSON 4. Selecting instructional methods.

The lesson explains the factors to be considered before selecting the instructional method(s) to be used with any segment of training. Guidelines are provided for selecting the instructional method(s) which will optimize the trainee's learning of specific content areas.

LESSON 5. Selecting instructional media.

This lesson explores the types of media that can be considered useful in operator training. Guidelines are provided for the selection of the best medium for each type of training content.

Table 1 (continued)

LESSON 6. Preparing a lesson plan.

The importance of a well-written lesson plan is discussed here. The general layout of a lesson plan is presented, as well as descriptions of the procedures for preparing a useful lesson plan.

LESSON 7. Preparing simple visual aids.

The purpose of this lesson is to familiarize the operator instructor with the criteria to be used for evaluating common forms of visual aids, both self-made and commercially prepared. Guidelines are provided for the general procedures to be followed in the preparation of a number of visual aids commonly used by most operator instructors. Emphasis is placed upon increasing trainee learning with the use of simple visual aids. A portion of this lesson is also self-instructional.

LESSON 8. Evaluating instruction.

This lesson emphasizes the use of evaluation to determine not only trainee performance, but also instructor and training program effectiveness. Guidelines are provided for the preparation of a number of common types of test items typically used by operator instructors. The purpose of the guidelines is to improve the relevance and quality of tests, quizzes and/or exercises administered to operator trainees.

LESSON 9. Controlling classroom learning.

This is the first of five lessons concerned with effective training delivery. In this lesson, the variables which affect trainee learning are described and the responsibility for controlling those variables to optimize trainee learning is clearly placed upon the instructor. A set of simple, easy-to-read principles are described which all instructors can use to increase their trainees' learning, regardless of the instructional method used.

LESSONS 10, 11, 12 and 13. Training delivery.

In each of these lessons, a common training delivery technique is examined. Good and poor examples of each technique are demonstrated on video tape. The video tape demonstrations are used as springboards for discussions which detail for your instructors those behaviors which foster and those which hinder classroom learning. Emphasis is solely upon classroom delivery techniques in each lesson:

. Lesson 10.	Training delivery:	Lecture
. Lesson 11.	Training delivery:	Group discussion
. Lesson 12.	Training delivery:	Demonstration
. Lesson 13.	Training delivery:	Trainee performance

Determination of Training Requirements

Conducting seminars for instructors of operator training courses which are meaningful and helpful requires first, that one identifies the knowledges and skills that are required to be a good instructor, and second, to determine how many of these knowledges and skills are possessed by your present or future instructors. As indicated earlier, the knowledges and skills required to be a good instructor (other than those of technical nature) have already been identified as part of the original contract effort, and form the content basis for the thirteen lessons in Section II of this manual. What is initially required of you as a training supervisor, is to determine the instructional weaknesses of your instructors in order to choose those lesson topic areas which most aptly address their needs. More specifically, your initial efforts should determine just how much your instructors know about the areas of training development and good classroom delivery techniques. Awareness of what your instructors know in these areas will enable you to design a seminar or series of seminars addressing only those specific areas in need of improvement. Developing seminars around your instructors' knowledge "gaps" will assure the most effective use of available seminar training time, aid in maintaining instructor interest and motivation, and ultimately upgrade operator training by strengthening instructor weaknesses.

Two methods are suggested in this section to help you identify the strengths and weaknesses of your instructors. Both techniques are self-assessment based, and take little time to administer. The first method, the use of the Instructor Background Sheet, can be used to get a very rough estimate of those areas in which instructors have had experience. A copy of this sheet is found in Table 2. Review of this self-report information will indicate number of years of instructional experience, areas of instructor strengths and weaknesses, and prior instructor training. In question number 8. the parentheses found beside each letter indicate the lesson number of the lesson plan in Section II which addresses that particular item. For example, 8.c "Preparing learner-based training objectives," is the center of focus in Lesson 2 in Section II of this manual.

Areas where instructors have indicated low levels of experience can provide the basis for selecting lessons in Section II to structure one or more training seminars. This sheet can be modified to suit your individual purposes, and is presented only as one suggested method for assessing instructor characteristics.

A second method of obtaining specific information regarding instructor strengths and weaknesses consists of a series of questions regarding the content of each of the thirteen lessons found in Section II of this manual. The Instructor Questionnaire (with suggested answers) found in Table 3, was originally developed and used as a pre-test for the one-week Instructor Development Workshops conducted by EPA. Ideally, you would have your instructors complete this questionnaire a number of weeks before you plan to conduct your first seminar. This will enable you to score the questions and identify those content areas most useful to your instructors.

Table 2

Instructor Background Sheet

1. Name ______________________________ 2. Date __________

3. Phone ______________ 4. Present Position/Title ______________

Years in Position ________

5. Major instructional responsibilities ______________________________

____

6. Number of years with instructor responsibilities ________

7. Major job functions/responsibilities ______________________________

____

8. In your job as an instructor how much experience have you had with:

(Circle One)

Lesson			None					Very Experienced
(1)	a.	Determining the tasks a trained operator must perform to do a good job.	1	2	3	4	5	6
(1)	b.	Identifying "gaps" in operator knowledge in order to develop relevant training.	1	2	3	4	5	6
(2)	c.	Preparing learner-based training objectives.	1	2	3	4	5	6
(3)	d.	Using IRIS or the Instructional Resources Center.	1	2	3	4	5	6
(4/5)	e.	Selecting instructional methods/ media which optimize trainee learning.	1	2	3	4	5	6
(6)	f.	Preparing thorough lesson plans.	1	2	3	4	5	6
(7)	g.	Preparing appropriate audiovisual aids.	1	2	3	4	5	6
(8)	h.	Evaluating instructional quality.	1	2	3	4	5	6
(9)	i.	Manipulating variables which foster adult learning.	1	2	3	4	5	6
(10)	j.	Delivering lectures.	1	2	3	4	5	6
(11)	k.	Conducting group discussions.	1	2	3	4	5	6
(12)	l.	Performing classroom demonstrations.	1	2	3	4	5	6
(13)	m.	Conducting performance-based trainee exercises.	1	2	3	4	5	6

9. Have you ever previously attended a seminar for instructors? Yes _____
No _____ If yes, what topics were addressed? ______________________

____

Table 3

Instructor Questionnaire*

Directions: The following questions are aimed at finding out what you know about the procedures involved in systematically developing and presenting a training course. The results will be used only to make decisions about the content of a planned seminar for instructors of water plant operators. Read each item carefully and write your answer in the space provided. Please state your answers as briefly as possible.

(1) 1. In one or two sentences, describe a situation in your area that suggests a need for water plant operator training.

[New laws: Written reports indicating poor operating performance; consumer complaints; requests from operators/supervisors; etc.]

(1) 2. What are the two general steps performed when conducting a task analysis?

a. [Breakdown a job into the specific tasks that must be performed to complete that job to a minimal of proficiency.]

b. [Identify the skills and knowledges required to perform each identified in the task breakdown.]

(2) 3. A good training objective is comprised of three parts. What are they?

a. [Given or conditions under which the action is to be performed.]

b. [The Action--a specification of what the trainee must do to demonstrate that he/she has mastered a unit of training.]

c. [The Standard--a specification of the criteria against which the action will be compared, and the level of proficiency to be demonstrated as minimally acceptabe.]

---

*A blank copy of this questionnaire for your use appears in Appendix A.

Table 3 (continued)

(2) 4. Write a good training objective to reflect the operator task of "Conduct a chlorine residual test."

[Given: A standard chlorine test kit and three water samples.

Action: Measure the amount of chlorine residual. Standard:

Within ten minutes; results for each sample will not vary from

actuals by more than 5%.]

(4) 5. Describe two general guidelines that should be used in sequencing instructional activities to optimize learning.

a. [General concepts should be taught before specific. Knowledges should be taught before skills.]

b. [Prerequisite should be taught first. Similar procedures/concepts/process should be taught together.]

(9) 6. In general, learning is fastest when: [Check (✓) all that apply.]

____ Training activities do not require the trainee to respond.

____ Visual aids are kept to a minimum.

____ Test results are reviewed no earlier than one week after a test.

✓ Activities are directly job related.

____ Only one instructional method is used throughout a course.

(4) 7. An instructor lecture is most appropriate for which stage of trainee learning? [Check (✓) your answer.)

✓ Early stage.

____ Middle stage.

____ Final stage.

Table 3 (continued)

(5) 8. Which of the media categories below would be most helpful in training an operator to replace a valve seal. [Check (✓) your answer.]

_____ Programmed instruction.

__✓__ Instructor demonstration.

_____ Textbook description.

_____ Training film.

(3) 9. The U.S. EPA has developed nationally applicable training programs in which of the following areas? [Check (✓) your answers.]

_____ Water plant operator training.

__✓__ The procedures for administering requests for variances and exemptions.

_____ Water plant maintenance training.

__✓__ Testing for chlorine residual and turbidity.

_____ Water plant supervisor management training.

(6) 10. If you develop instructor lesson plans for a training course for which you will NOT be the instructor, the lesson plans should: [Check (✓) your answers.]

_____ be in outline form.

__✓__ include specific questions to be asked.

__✓__ specify the technical content of the lesson.

__✓__ indicate page numbers of referenced trainee materials.

(1) 11. List two types of information that you MUST have before you can determine what the training content of a course will be:

a. [Knowledge and skill levels of the training population.]

b. [Knowledges and skills required to perform the job for which training is being developed.]

Table 3 (continued)

(8) 12. The most appropriate test form for assessing knowledge of states and their capitals is:

_____ True-False.

_____ Multiple-choice.

_____ Essay.

__✓__ Matching.

_____ Short Answer.

(8) 13. Which True-False question below is written in the best form? [Check (✓) your answer.]

_____ Water always freezes at 32°.

_____ The MCLs for arsenic and chromium are 0.07 and 0.045 respectively.

__✓__ A molecule of water is heavier than a molecule of salt.

_____ Lead service lines never cause water to exceed the allowable MCL.

14. How would you rate your confidence in your ability to: [Check (✓) the number that indicates your degree of confidence.]

		VERY CONFIDENT					LITTLE OR NO CONFIDENCE
		1	2	3	4	5	6
(7)	a. Identify good and poor audiovisual materials.						
	b. Prepare audiovisual materials that meet the criteria for good design.						
(3)	c. Obtain resources contained in IRIS.						
	d. Obtain resources contained in IRC.						
(10)	e. Conduct an instructional lecture.						
	f. Recognize and specify instructor behaviors which characterize a good instructional lecture.						
(11)	g. Conduct a group discussion.						

Table 3 (continued)

15. (continued)

		VERY CONFIDENT					LITTLE OR NO CONFIDENCE
		1	2	3	4	5	6
(11)	h. Recognize and specify instructor behaviors which create a good group discussion.						
(12)	i. Conduct an instructional demonstration.						
	j. Recognize and specify instructor behaviors which characterize a good instructional demonstration.						
(13)	k. Conduct a performance exercise.						
	l. Recognize and specify instructor behaviors which create a good performance exercise.						

As with the Instructor Background Sheet, each item in the Instructor Questionnaire references a lesson found in Section II of this manual. The specific lesson plan number is indicated by the number in parentheses beside each question number. In some cases an item may be covered by two lessons, both of which should be addressed in your seminar if your instructors show a weakness on that item, (e.g., 15.6 would require Lessons 5 and 7). As with the Instructor Questionnaire, areas of weakness provide the basis for selecting lessons in Section II, structuring one or more training seminars.

You may choose to add or delete items from the Instructors Questionnaire based upon your familiarity with the skills and knowledges of your instructors.

Remember, the sole purpose of either of these techniques is to enable you to prepare training seminars in those areas where your instructors are weakest, or have low levels of experience or confidence. The following sources of information may provide more accurate input regarding instructor training needs, and should be considered as part of your instructor evaluation:

1. Schedule random visits to ongoing operator training classes to watch instructors in action. Observation of trainee interest and attention, instructor delivery, instructional techniques, and use of audio-visuals etc., will provide information regarding instructional quality.
2. Talking with instructors individually or collectively regarding their own perceived needs for training is frequently informative.
3. Talking with samples of trainees in operator classes will also indicate areas of instructor weakness.
4. Reviewing certification test results may indicate areas of content in need of improvement, and may also indicate whether some instructors are more effective than others.

Selecting Materials

Examination of the Instructor Background Sheet (IBS), the Instructor Questionnaire (IQ), or other sources of information, will indicate areas of instructor weakness. The lesson numbers associated with each item on the IBS and IQ indicate those lessons in Section II which have been prepared to provide training in areas typically identified as instructor weaknesses. Problems can be anticipated in one of two areas: Training development or actual delivery. Training development procedures are covered in Lessons 1-8, and training delivery in Lessons 9-13.

In order to plan effective instructor training seminar(s), decisions must be made regarding the sequences in which lessons are to be administered, since some lessons are prerequisite to others. In addition, time available for conducting instructor seminars must be considered. Table 4

Table 4

SECTION II. LESSON PLAN TITLES GROUPED BY CONTENT AREA, AND INDICATING PREREQUISITES

GROUP A. TRAINING DEVELOPMENT

Lesson Plan No.	Title	Prerequisite Lesson(s)	Approximate** Administration Time in Hours
1	Determining Training Content		3
2	Writing Useful Training Objectives	*	4
3	Sources of Operator Training Materials		1
4	Selecting Instructional Methods	2	2
5	Selecting Instructional Media	2	2
6	Preparing a Lesson Plan	2	2
7	Preparing Simple Visual Aids	5	2
8	Evaluating Instruction	2	2

GROUP B. TRAINING DELIVERY

Lesson Plan No.	Title	Prerequisite Lesson(s)	Approximate** Administration Time in Hours
9	Controlling Classroom Learning		1
10	Training Delivery: Lecture	9	1.5-2
11	Training Delivery: Group Discussion	9	1.5-2
12	Training Delivery: Demonstration	9	1.5-2
13	Training Delivery: Trainee Performance	9	1.5-2

*It is assumed that operator tasks have been analyzed and that the specific tasks to be trained which are not already in the incoming operator trainees repetoire have been identified. If this assumption has not been met, it is recommended that Lesson 1 precede Lesson 2.

**All times are approximate and include time spent on practical exercises. Greater flexibility in meeting the demands of available training time may be obtained by reducing (not omitting) the time to be spent upon the exercises. In addition, Lessons 2 and 7 include self-instructional readings which could be completed prior to an actual training session thus reducing the lesson time indicated in this table.

lists the 13 lesson titles with lesson prerequisite and estimated delivery time. The lessons in Table 4 have been grouped into those which are concerned with training development (Group A) and those which are concerned with training delivery (Group B). In Table 4, it may be seen that in Group A, Lesson 2 "Writing Worthwhile Training Objectives" is a prerequisite for Lessons 4-8. It can be seen that methods, media, evaluation, etc., serve the sole purpose of assuring that the training objectives are met. In Group B, Lesson 9 "Controlling Classroom Learning," presents the learning framework which underlies the specific techniques described in Lessons 10-13. Once lessons 2 and 9 have been mastered, they only need to be reviewed briefly prior to the administration of subsequent lessons, in order to provide continuity in the development of instructional concepts. It is important to note that lessons in Group A are not prerequisite to any lessons in Group B, and vice versa.

These limited prerequisites provide ample flexibility for the preparation of a wide variety of topics for any given seminar. Additional flexibility is provided by the "stand-alone" nature of the instructional materials in Section II.

Sample Agendas

Once you have identified and sequenced the lessons most responsive to your instructor's training needs, you will be able to proceed with planning the conduct of those lessons. Of course, you will have to plan seminar(s) to meet the constraints placed upon you by the administration times of each lesson as summarized in Table 4, and by the time that you may have available for assembling instructors for attendance at any given seminar. Reviewing Table 4, it can be seen that a seminar training session consisting of one lesson can be as short as one hour or as long as four hours. Such seminars could easily be planned for a single evening or for a brief period of time during or after normal working hours. Of course, lessons can be combined (within the limitations of the prerequisite requirements) to construct half-day, or full-day series of seminars to meet your training needs.

Because of the variation in available training time and differences in training needs for any given training supervisor, it is not possible to describe all possible seminar agendas. Some of the more obvious agendas do present themselves and are described in the tables which follow.

Administration of the Total Program. In your particular state, it may be possible that your instructors are all technically quite competent, but have never been exposed to nor have received any formal training in the areas of training development or training delivery. In this situation, you may consider conducting a series of seminars addressing all thirteen of the lessons in the curriculum. Should this be the case, you may choose to conduct seminars as a series of full-day, half-day or two-hour training sessions. Table 5 describes the recommended sequence of administration of the thirteen lessons. In addition, the approximate number of days that are required to administer the total program is indicated for those

Table 5

Three Agendas for Administration of the Total Instructional Program

RECOMMENDED SEQUENCE	THREE AGENDAS		
Lesson/Topic	Full-day Sessions	Half-day Sessions	Two-Hour Sessions
1. Determining Training Content	Day 1	Day 1	Day 1, Day 2
2. Writing Useful Training Objectives	Day 1	Day 2	Day 3, Day 4
3. Sources of Operator Training Materials	Day 2	Day 3	Day 5
4. Selecting Instructional Methods	Day 2	Day 3	Day 6
5. Selecting Instructional Media	Day 2	Day 4	Day 7
6. Preparing a Lesson Plan	Day 2	Day 4	Day 8
7. Preparing Simple Visual Aids	Day 3	Day 5	Day 9
8. Evaluating Instruction	Day 3	Day 5	Day 10
9. Controlling Classroom Learning	Day 3	Day 6	Day 11
10. Training Delivery: Lecture	Day 3	Day 6	Day 12
11. Training Delivery: Group Discussion	Day 4	Day 7	Day 13
12. Training Delivery: Demonstration	Day 4	Day 7	Day 14
13. Training Delivery: Trainee Performance	Day 4	Day 8	Day 15

conditions where full-days, half-days or two-hour training sessions are available. It can be seen in Table 5 that if you can arrange a series of one-day training seminars, the total program could be completed in four days. If you can arrange only half-day or two-hour training sessions, completion of the total program will require eight and fifteen days respectively. Of course, the total program can be administered in a mixture of full-day, half-day and two-hour training sessions depending upon varying time pressures. The materials in Section II may provide enough new and worthwhile content to institute a frequent and regular in-service training program that can be extended to include training in areas of technical content.

A Single Full-Day Broad-Coverage Seminar. While you may not want to eventually provide your instructors with training in each of the lessons, you may be facing an immediate need to give your instructors as much as possible covering development and delivery in a single day. Such a situation obviously requires omitting some materials from inclusion in the seminar. Our experience indicates that if you are restricted to a single one-day seminar, that the content areas in Table 6 are seen as those most helpful for upgrading the quality of operator training.

Table 6

Agenda for a Single, One-Day Broad-Coverage Seminar

	Lesson/Topic	Time
2.	Writing Useful Training Objectives	2.5 hours*
6.	Preparing A Lesson Plan	2 hours
7.	Preparing Simple Visual Aids	1 hour*
9.	Controlling Classroom Learning	1 hour
10.	Training Delivery: Lecture	1.5 hours

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*Assigning the self-instructional reading and a portion of the exercises to be completed before coming to the seminar.

Training Delivery Seminar. In some states, the operator training program has been developed using sound instructional development principles by personnel with instructional design expertise. In those cases, the training needs will fall more in the area of training delivery. If you would like to present a training seminar which focusses upon training delivery, one of the three agendas in Table 7 should suit your needs.

Table 7

Three Agendas for a Training Delivery Seminar

RECOMMENDED SEQUENCE		THREE AGENDAS		
	Lesson/Topic	Full-Day Sessions	Half-Day Sessions	Two-Hour Sessions
9.	Controlling Classroom Learning	Morning	Day 1	Day 1
10.	Training Delivery: Lecture	Morning	Day 1	Day 1
11.	Training Delivery: Group Discussion	Morning	Day 2	Day 2
12.	Training Delivery: Demonstration	Afternoon	Day 2	Day 3
13.	Training Delivery: Trainee Performance	Afternoon	Day 2	Day 4

Audio-Visual Seminar. If your instructors are using well developed training, have good training objectives and adequate delivery skills, but still have some problem with trainee attention in class, it may be the result of inadequate use of audio-visual materials. In this circumstance, you may want to design an instructor training seminar which focusses upon the use of AV materials in operator training. Table 8 presents suggested topics for just such a seminar, with two agendas depending upon your available training time. Remember, the agendas in Table 8 assume that the prerequisites described in Table 4 have been met.

Table 8

Two Agendas for an Audio-Visual Seminar

RECOMMENDED SEQUENCE		TWO AGENDAS	
	Lesson/Topic	Half-Day Sessions	Two-Hour Sessions
2.	Review: Writing Useful Training Objectives	Day 1*	Day 1*
4.	Review: Selecting Instructional Methods	Day 1	Day 1
5.	Selecting Instructional Media	Day 1	Day 1
7.	Preparing Simple Visual Aids	Day 1	Day 2*

*Pre-course reading of self-instructional materials in these lessons will assist in shortening classroom time.

Training Development Seminar. While all states are conducting operator training, there is wide variation in the instructional quality of those programs. In many cases, operator training courses have grown spontaneously over a period of time, as a collection of independent thoughts and notes from various technically oriented personnel hired to do the teaching. In few cases has an operator training course been developed from the ground up, employing sound, systematic instructional-design techniques. You may choose to have your instructors rebuild all or portions of your existing operator training course using such techniques. To do so will require that your instructors become familiar with basic principles of instructional design. The sequence of lessons presented in Table 9 outlines the basic instructor familiarization needed before operator training course revisions can begin. As in prior tables, three sample agendas are provided to suit differences in available training time. In this seminar, the preparation of actual lesson plans and audio-visuals are not addressed, but could be added as seen fit.

Table 9

Three Agendas for a Basic Training Development Seminar

RECOMMENDED SEQUENCE	THREE AGENDAS		
Lesson/Topic	Full-Day Sessions	Half-Day Sessions	Two-Hour Sessions
1. Determining Training Content	Day 1	Day 1	Day 1, Day 2
2. Writing Useful Training Objectives	Day 1	Day 2	Day 3, Day 4
4. Selecting Instructional Methods	Day 2	Day 3*	Day 5*
5. Selecting Instructional Media	Day 2	Day 3*	Day 5*
8. Evaluating Instruction	Day 2	Day 3	Day 6

*Lessons 4 and 5 can be presented in two hours if they are presented back-to-back.

As can be seen in Table 9, the instructional materials presented in Section II of this manual can be used to fill a wide variety of training needs and available training times. Examples have been provided to indicate just a few of the large number of agendas that you can create from those materials. Once you have determined your training needs, it will be ar easy matter for you to select the appropriate lessons and plan their delivery to suit your available training times.

Before you begin planning your first seminar, however, you will find it useful to review the nature of materials you will find in each lesson plan. Descriptions of Section II organization and lesson plan contents are provided in the introduction to Section II.

SECTION II

INSTRUCTOR LESSON PLANS

SECTION II. INSTRUCTOR LESSON PLANS

Introduction

In Section I, procedures were described for planning one or more seminars to meet the training needs of instructors under your supervision. You will find the necessary instructional materials to conduct your planned agenda in this section.

Section II contains complete instructor lesson plans for each of the thirteen lessons described in Section I. Each Lesson Plan is divided into three parts:

1. Lesson Plan Cover Sheets
2. Detailed Lesson Plan
3. Instructional Materials

Lesson Plan Cover Sheets

For each Lesson Plan, you will find three cover sheets. The first sheet, as may be seen in Figure 1, contains the lesson number and title, the general purpose of the lesson and the lesson training objective(s). Notice that the training objective is written in three parts to specify what the trainee (your instructors) must be able to do upon completion of the lesson (Action), how well the action must be performed (Standard), and what materials you are going to provide (Given) when the action is to be performed.

On the second cover sheet (See Figure 2), you will find a listing of:

1. The instructional techniques employed in the lesson.
2. Materials to be supplied to the seminar participants.
3. Instructional materials that you will need to conduct the lesson.
4. References that may be helpful to you in preparing to conduct the lesson.
5. The estimated amount of time that it will take to conduct the lesson.
6. The general sequence of activities that occur in the lesson.

LESSON TITLE:

PURPOSE:

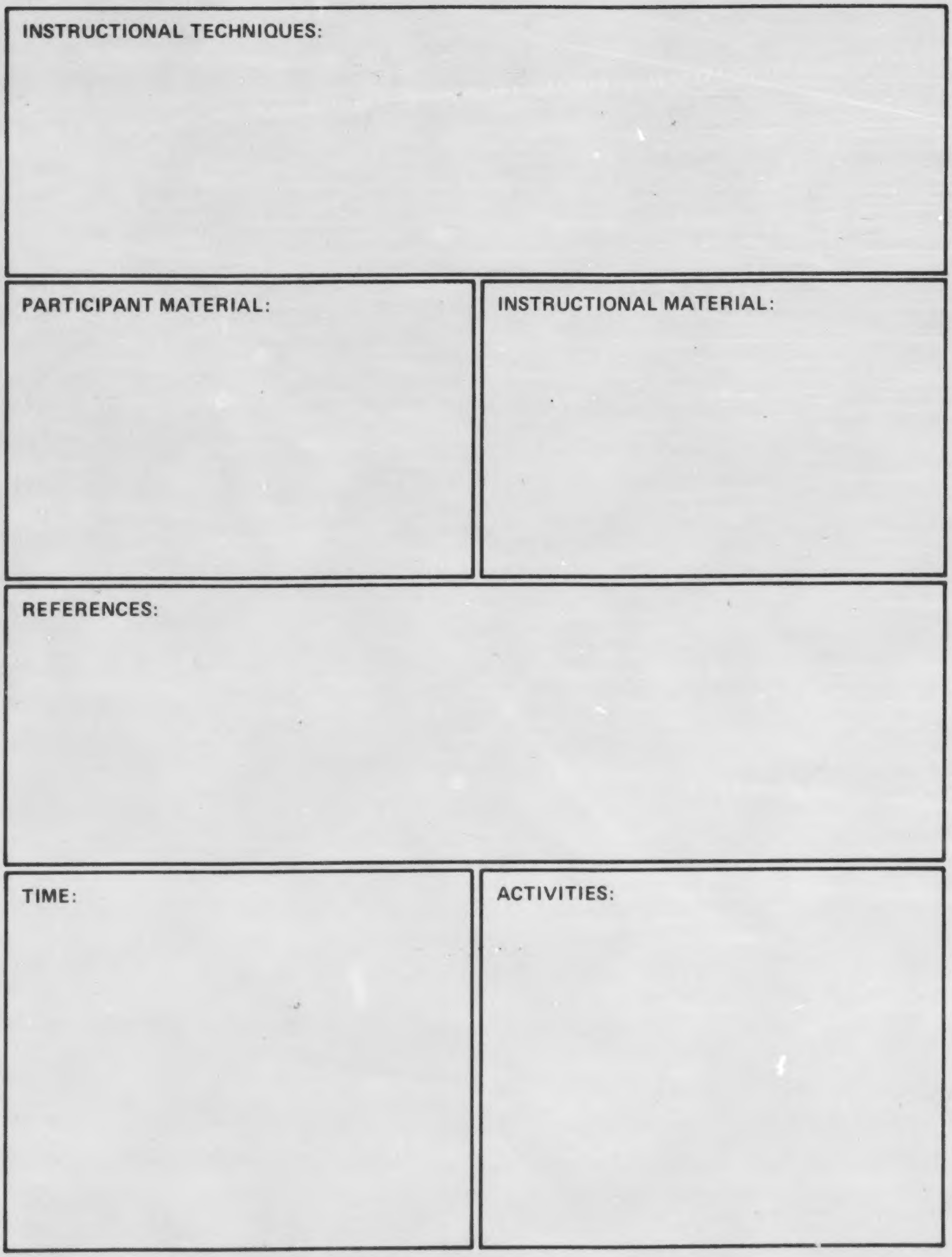
TRAINING OBJECTIVE

GIVEN:

ACTION:

STANDARD:

Figure 1. First Cover Sheet



INSTRUCTIONAL TECHNIQUES:

PARTICIPANT MATERIAL:

INSTRUCTIONAL MATERIAL:

REFERENCES:

TIME:

ACTIVITIES:

Figure 2. Second Cover Sheet

The third and last cover sheet (Figure 3) describes the instructional activities of the lesson as they have been designed to facilitate early, intermediate, and final stages of student learning. Table 10 is a glossary of the terms found on the cover sheets, and is provided here for your reference.

Detailed Lesson Plans

The Detailed Lesson Plan (DLP) provides a step-by-step written description of the activities that the instructor is to perform in the conduct of the lesson. The DLP includes lecture notes, questions, demonstration instructions, preparation suggestions, etc., where necessary. A sample DLP page from Lesson 1 is presented in Figure 4. The DLP contains:

1. Blank entries for lapsed time that you may fill in as you become more familiar with lesson content.
2. Instructional Events. Detailed descriptions of what you are to do as the instructor. In Figure 4, there are lecture notes, discussion guidelines, and class questions included for this portion of Lesson 1.
3. Support Materials/Notes. Indicates whether support materials are provided, type of support material (overhead transparencies, videotapes, self-instructional readings, handouts, exercises, etc.), and at what point in the lesson the support material is to be used. In Figure 4, overhead transparency 1-1 is to be used for the "Train or Not to Train" discussion question in IIA. All support materials (except videotapes) may be found in the section entitled "Instructional Materials," immediately following the lesson DLP.

At the end of the DLP pages, you will find copies of all exercises that participants will be required to perform for that lesson, along with the suggested answers to those exercises.

Instructional Materials

Immediately following the DLP pages for each lesson, you will find paper copies of all the support materials referenced in the DLP. These include:

1. Printed copy of all overhead transparencies
2. Complete self-instructional readings
3. Handouts
4. Exercises

everything but videotapes.

INSTRUCTIONAL TECHNIQUES:

PARTICIPANT MATERIAL:	INSTRUCTIONAL MATERIAL:

REFERENCES:

TIME:	ACTIVITIES:

Figure 3. Third Cover Sheet

Table 10

Lesson Plan Glossary

PURPOSE: This is a brief statement of the overall goal of the lesson. It describes the relevance of the subject material and explain why the participant is being asked to master the skills and knowledge in the lesson, if this is not self-evident.

ACTION: This statement tells the participant precisely what he/she must be able to do to demonstrate mastery of the material.

GIVEN: This tells the participant the circumstances under which he/she will perform, or the objects, information, or assistance the participant will have access to while performing. The participant should perform under conditions as close to real situations as is practical in the instructional situation.

STANDARD: This tells the participant the acceptable level of performance that will be required of him/her to demonstrate mastery of the objective.

INSTRUCTIONAL TECHNIQUES: The instructional methodologies used to communicate lesson skills and knowledges, e.g., lecture, demonstration, group discussion, film, role-play, etc.

Table 10 (continued)

PARTICIPANT MATERIALS:	Those items the student must have either prior to or during the presentation of the lesson in order to participate fully in the lesson's activities (e.g., pens, pads, technical outline subject handout).
INSTRUCTOR MATERIALS:	Those items the instructor must have readily available in order to present the lesson (e.g., film strips, written exercises, handouts, film plus projector and screen, etc.).
REFERENCES:	Those specific documents, lectures, sources from which the content of the lesson is drawn and which are cited or included in the instructor's or participant's material.
TIME:	The unit of time allotted for each lesson of the course. Times are approximate and will vary according to number and knowledgeability of the participants.
ACTIVITIES:	A sequential listing of activities within each lesson, as conceived by the designer as the best way to accomplish the lesson's objectives (e.g., introduction, demonstration group practice, group discussion, summary).

INSTRUCTIONAL EVENTS

EARLY STAGE:	Usually a presentation by the instructor, in lecture form supported by overheads, of the basic concepts, principles, etc., to be covered in the lesson.

Table 10 (continued)

INTERMEDIATE STAGE:	Usually an opportunity for participants to practice applying the concepts, principles, etc., in specific cases.
FINAL STAGE:	Demonstration by the participants of their understanding of the concepts, principles, etc., usually applied to the development of instructional materials. Note that there is always provision for *feedback* so that any errors or misconceptions can be corrected immediately.

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	I. Introduction.	
	A. Explain that before one can develop training, it is imperative to have well written objectives which are based upon actual training needs.	
	B. In this unit, we will examine the general procedures for identifying what needs to be trained.	
	II. Development.	
	A. "To train or not to train, that is the first question." Solicit responses from participants which, in their experience, indicate that training may be needed. (Write responses on chalkboard or flip chart.)	Overhead 1-1
	B. Summarize with these observations about participant responses:	Overhead 1-2
	1. There are situations where training is not the answer to the problem.	
	2. Importance of good lines of communication, and regular system checks.	
	C. Emphasize the point that training is needed where:	
	1. The job is not being performed properly.	Overhead 1-3
	2. Present personnel have the ability to perform the job but do not have the skills and knowledges.	
	3. Job constraints are not interfering with job performance.	
	D. Question. "To what end should you address the training?"	
	1. Solicit responses from participants.	
	2. Discussion should be led so that there is agreement that training	

Figure 4. Sample Detailed Lesson Plan

With the exception of the videotapes, all materials in the Instructional Materials section of each lesson are intended to be reproduced (photocopied, printed), including of the overhead transparencies. Reproduced materials can then be made into a booklet to be distributed by you to your participants. Participants will then have a permanent record of the more important points of each lesson that they can refer to when they return to their instructional duties. The on-the-job reference aspect of the materials provides the basis for the recommendation that paper copies of all overhead transparencies be included in the participant materials.

The printed copies of overhead transparencies found in each lesson can be made into actual transparencies without much difficlty. Most photocopy machines and quick printing machines can be loaded with the acetate materials used for overhead transparencies. When the copiers' paper has been replaced by acetate sheets (or rolls), making tranparencies is identical to photocopying, except that the finished copy is on acetate rather than paper. If you are not familiar with the procedures for using a photocopier to make overhead transparencies, check with the photocopier manufacturer's representative or salesperson in your area, or check a local quick-print store nearby.

Numbering

All materials for each lesson are numbered. The cover sheets and DLP pages are numbered sequentially with the lesson number first followed by the sequence number. Thus, page 2-7 is page 7 of Lesson 2. All the instructional materials carry the number as referenced by the DLP (i.e., Overhead 2-2, Self-Instructional reading 2-1, Handout 3-2, etc.).

LESSON TITLE:

Lesson 1. Determining Training Content

PURPOSE:

1. To familarize participants with the cues which indicate a need for training as well as the techniques for gathering information to make this assessment.
2. To provide participants with the basic procedures of separating a job into manageable units of work activity and determine the underlying skills and knowledges of the identified tasks.
3. To provide participants with the skills and knowledges required to write behavioral oriented training objectives.

TRAINING OBJECTIVE

GIVEN:

1. & 2. Examples of task statements.

3. A specific job.
4. Brief descriptions of personnel capabilities and job information.
5. Needs assessment information and a topical task breakdown of the job of instructor.

ACTION:

1. Participants will identify those tasks which are written in proper form.
2. Participants will judge whether the level of detail of the task statement is adequate.
3. Participants will perform a task breakdown.
4. Participants will identify training requirements from a set of given alternatives.
5. Participants will identify those training requirements of highest priority.

STANDARD:

1. & 2. With 100% accuracy.

3. Tasks will be written in task-statement form and to an appropriate level of detail.
4. 100% correct identification.
5. Must be logically derived from the needs assessment and task information provided.

INSTRUCTIONAL TECHNIQUES:

1. Lecture/Overheads
2. Group discussion
3. Performance/Application

PARTICIPANT MATERIAL:

1. Participant's Handbook
2. Handouts
3. Individual exercise
4. Group exercise

INSTRUCTIONAL MATERIAL:

1. Overhead projector
2. Overhead transparencies
3. Handouts
4. Exercises

REFERENCES:

TIME:

4 hours

ACTIVITIES:

1. Lecture/Discussion
2. Individual exercise
3. Review
4. Lecture/Overhead
5. Individual exercise
6. Review

INSTRUCTIONAL EVENTS

I. EARLY STAGE

1. Group discussion of cues in the training environment which indicate a possible need for new/updated training.
2. Instructor lecture reviewing the steps performed in completing a task analysis.
3. Brief lecture with overheads describing the process of identifying training requirements.

II. INTERMEDIATE STAGE

1. Lecture/discussion reviewing the advantages and disadvantages of using common data collection techniques to ascertain the need for training.
2. Participants will perform two practice exercises identifying good and poor task statements as well as identifying task statements which are and are not of adequate detail.
3. Participants perform an individual exercise in which brief descriptions of job tasks and personnel capabilities are reviewed to determine the appropriate training requirements.

III. FINAL STAGE

Instructional teams will review hypothetical data to determine whether a need for training exists.

1. Participants will complete a task breakdown of a simple job.

2&3. Group exercise in which groups are provided with a task breakdown of the job of instructor, with hypothetical personnel capabilities, and needs assessment information. Groups are to apply information learned to identify the training requirements upon which to base an instructor's workshop training.

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	I. Introduction.	
	A. Explain that before one can develop training, it is imperative to have well written objectives which are based upon actual training needs.	
	B. In this unit, we will examine the general procedures for identifying what needs to be trained.	
	II. Development.	
	A. "To train or not to train, that is the first question." Solicit responses from participants which, in their experience, indicate that training may be needed. (Write responses on chalkboard or flip chart.)	Overhead 1-1,
	B. Summarize with these observations about participant responses:	Overhead 1-2
	1. There are situations where training is not the answer to the problem.	
	2. Importance of good lines of communication, and regular system checks.	
	C. Emphasize the point that training is needed where:	
	1. The job is not being performed properly.	Overhead 1-3
	2. Present personnel have the ability to perform the job but do not have the skills and knowledges.	
	3. Job constraints are not interfering with job performance.	
	D. Question. "To what end should you address the training?"	
	1. Solicit responses from participants.	
	2. Discussion should be led so that there is agreement that training	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	should only address skills, knowledges and attitudes that are needed to perform the job correctly and which the trainee does not already possess.	
	3. The skills and knowledges to be learned are called training requirements.	Overhead 1-4
	E. Question. "What two general types of information are needed to determine training requirements?"	Overhead 1-5
	1. The skills and knowledges that the trainee possesses.	
	2. The specific tasks (with their requisite skills and knowledges) that are required to perform the job.	
	3. Have participants review Handout 1-1, Solicit any other information that should be added.	Handout 1-1
	4. Question: How is this information obtained?	
	5. Refer participants to Handouts 1-2 thru 1-5. Indicate that the handouts are for reference and are to be read at the participants leisure.	Handouts 1-2 thru 1-5
	F. Explain the basic guidelines for breaking a job down into specific tasks.	
	1. Determine only what must be done to do the job well.	
	2. Use brief statements comprised of only action verbs (observable behaviors) and nouns (plus a descriptive adjective or two as necessary).	
	3. Briefly go over job breakdown flowcharts.	Overheads 1-6 and 1-7
	4. Review instructions on Exercise 1-1.	Exercise 1-1

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	5. Review answers.	
	G. Explain that the next step toward establishing sound training objectives is to identify the skills and knowledges that are required to perform each task.	
	1. This step is necessary since the skills and knowledges desired dictate a training program's content.	
	a. Training for knowledge different than for skills.	
	b. Examples of knowledges.	Overhead 1-8
	c. Examples of skills.	Overhead 1-9
	2. Explain term "task analysis" and its two parts.	Overhead 1-10
	3. Provide an example of task analysis.	Overhead 1-11,
	H. Review the first two steps of training development and explain the derivation of training requirements.	
	1. First two steps were:	
	a. Determine trainee characteristics.	
	b. Perform task analysis. (Explain in simple terms.)	
	2. Explain that training requirements are those skills and knowledges which are required by the job that the trainee does not possess.	Overhead 1-12
	3. Explain the process of deriving training requirements using Overhead 1-13.	Overhead 1-13
	4. Review instructions on Exercise 1-2.	Exercise 1-2
	5. Review answers to complete exercises.	

Answers for Exercise 1-1

PART I. Indicate which task statements are written in GOOD form and which are written in POOR form by placing a check mark (✓) in the appropriate column.

	GOOD	POOR
1. Monitor flowmeter.	✓	
2. Write daily work plan for all maintenance and operating personnel on the last day of each month.		✓
3. Demonstrate maintenance procedure.	✓	
4. Score written tests.	✓	
5. Understand question.		✓
6. Take hourly inspection tour.		✓
7. When you are lecturing to a class, make sure you speak clearly and audibly.		✓

PART II. Indicate which of the following task statements have described a task to the level of detail that skill and knowledge requirements can be identified.

	Not Enough Detail	Acceptable Detail	Too Much Detail
1. Place pencil point on paper.			✓
2. Prepare test answer key.		✓	
3. Conduct class.	✓		
4. Perform checmical analysis.	✓		
5. Connect TV monitor to videotape playback unit.		✓	

Answers for Exercise 1-1
Page Two

PART III. The following are listings of items needed to complete various procedures. Your group will be assigned one of these items. Write a set of task descriptive statements for the items assigned to your group. Write your task statements on your group's flip chart.

1. Given a cold water source, a water heating device, a jar of instant coffee, a teaspoon, an empty cup with saucer, a cup of sugar, a cup of nondairy creamer, and a pot, make a cup of coffee. *

2. Given a box of cake mix, dozen eggs, a cold water source, measuring cups, hand mixer and bowl, wooden spoon, two cake pans, flour, stick of oleo, and an oven, make a cake (no icing). *

3. Given a typewriter, a completed letter, an envelope, person's name and address, a stamp, and a mailbox, send a letter. *

* ANSWERS: There are a variety of task statements that can be written for each procedure. As long as the groups' task statements are consistent with the guidelines set forth in this unit, they can be considered correct.

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Answers for Exercise 1-2

Place a check mark (✓) next to the most appropriate alternative(s).

1. A former automobile mechanic has applied for a maintenance position at a large water treatment plant. Which of the following skills or knowledges is the applicant least likely to need addressed in training?

    _____ a. Basic pump familiarization.

    __✓__ b. Use of hand tools.

    _____ c. Water plant safety procedures.

    _____ d. Valve maintenance.

2. The Public Health Service has just issued new procedures for testing six common water elements. These new procedures are very similar to those already being used in your lab. You would like to have your experienced laboratory technicians learn the new procedures. Which of the below represents the most appropriate and efficient training requirement?

    _____ a. Knowledge of the existing procedures for testing.

    __✓__ b. Knowledge of those particular steps in the procedures which are new.

    _____ c. Knowledge of each of the steps of the new procedure.

    _____ d. Knowledge of the rationale for changing the old procedures.

3. You have just purchased a new integrated carousel slide/tape projector/recorder unit for use in your classrooms. You wish to provide some training for your instructors in the operation of the unit. You also want to make them aware of the slide/tape packages available for use in training water supply operators. Your instructors routinely use carousel projectors to show slides they have taken themselves, and provide their own narration. Which of the skills and knowledges below would not be appropriate training requirements?

    _____ a. Knowledge of how to load a cassette into the new unit.

    _____ b. Knowledge of the advantages of using slide/tape packages.

    _____ c. Knowledge of optimal projection distances for the unit.

    __✓__ d. Knowledge of how to correctly place a slide into a standard carousel.

Answers for Exercise 1-2
Page Two

4. A water plant supervisor job has as one of its task statements, "writes work order requests." The knowledge of how to correctly complete a work order request form should be least likely as a training requirement for which of the following applicants?

   _____ a. A former English teacher.

   _____ b. A former service station attendant.

   _____ c. A former owner/manager of a small hardware store.

   __✓__ d. A former maintenance shift supervisor at a large surface mine.

INSTRUCTIONAL MATERIALS

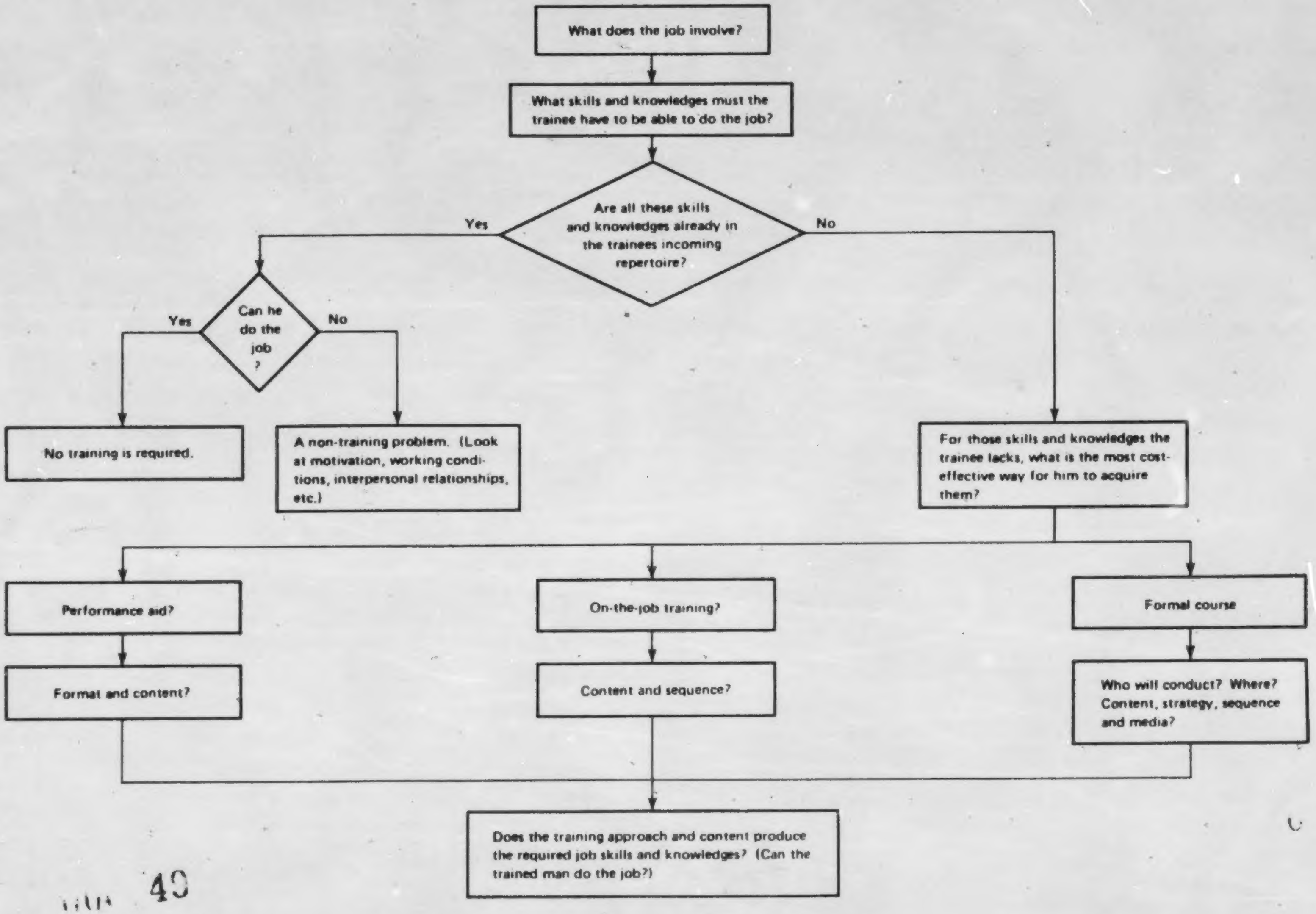
Lesson 1. Determining Training Content

Overhead 1-1

TO TRAIN
OR
NOT TO TRAIN,

THAT IS THE QUESTION.

QUESTIONS ASKED BY THE TRAINING DESIGNER



What does the job involve?

What skills and knowledges must the trainee have to be able to do the job?

Are all these skills and knowledges already in the trainees incoming repertoire?

Yes

Can he do the job ?

Yes

No training is required.

No

A non-training problem. (Look at motivation, working conditions, interpersonal relationships, etc.)

No

For those skills and knowledges the trainee lacks, what is the most cost-effective way for him to acquire them?

Performance aid?

Format and content?

On-the-job training?

Content and sequence?

Formal course

Who will conduct? Where? Content, strategy, sequence and media?

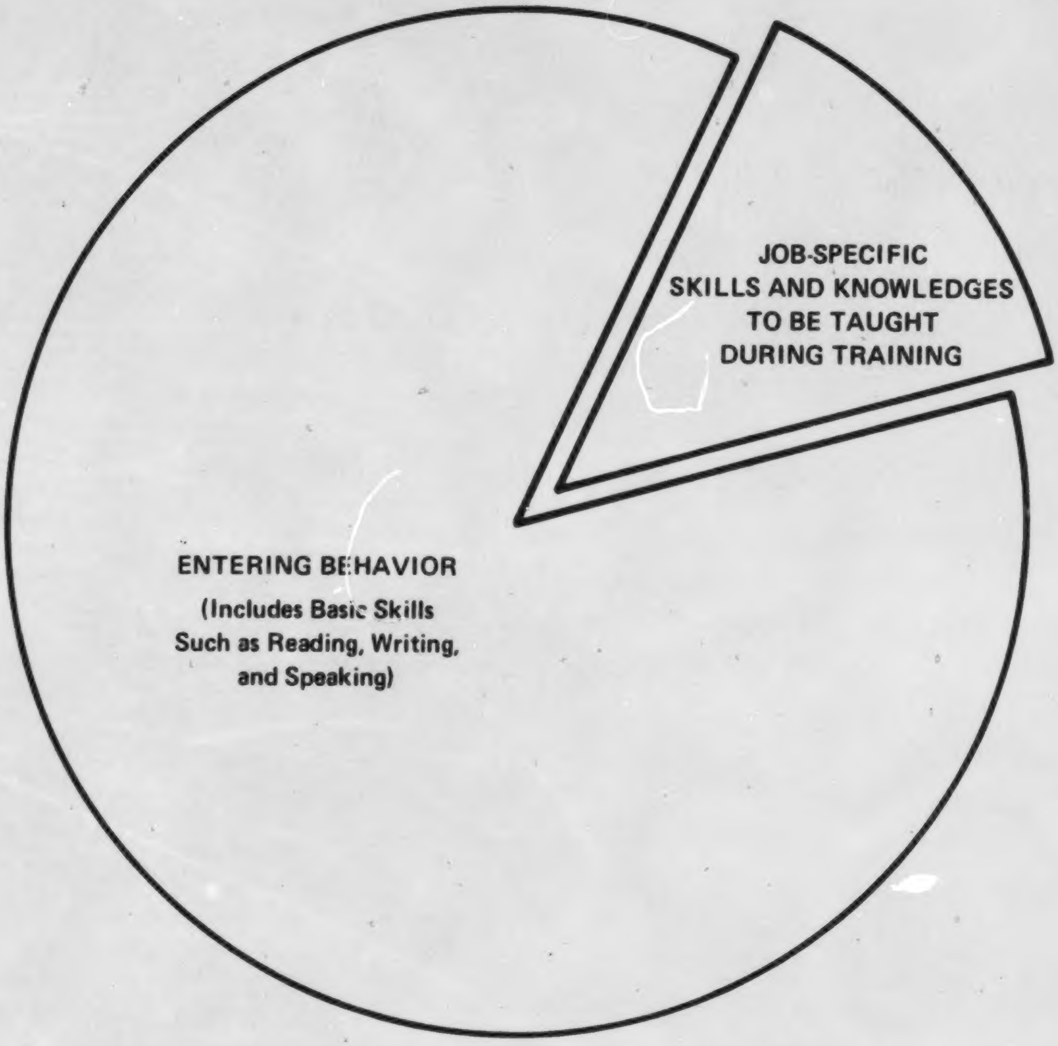
Does the training approach and content produce the required job skills and knowledges? (Can the trained man do the job?)

Overhead 1-2

TRAINING NEEDED WHEN:

1. JOB NOT BEING PERFORMED PROPERLY.
2. JOB DOES NOT HAVE INTERFERING CONSTRAINTS.
3. PERSONNEL HAVE THE ABILITY, BUT NOT ALL THE SKILLS AND KNOWLEDGES TO PERFORM THE JOB.

TRAINING REQUIREMENTS:
SKILLS/KNOWLEDGES TO BE LEARNED THAT THE TRAINEE DOES NOT ALREADY POSSESS.


JOB-SPECIFIC SKILLS AND KNOWLEDGES TO BE TAUGHT DURING TRAINING
ENTERING BEHAVIOR
(Includes Basic Skills Such as Reading, Writing, and Speaking)

INFORMATION NEEDED TO DETERMINE WHAT TRAINING IS REQUIRED:

- THE SPECIFIC TASKS WHICH ARE REQUIRED TO DO THE JOB.

- JOB-RELATED CHARACTERISTICS OF THE TYPICAL TRAINEE.

HANDOUT 1-1

1. Job Performance Requirements. (e.g., What has to be done to perform the job correctly.)

2. Trainee capabilities.

   a. Education background.

      1) Years attended.

      2) Subjects/Major field.

      3) Degrees.

      4) Performance Awards.

   b. Work experience.

      1) Years at a particular job.

      2) Job responsibilities.

      3) Job performance.

         a) Self-report.

         b) Supervisor's report.

         c) Student's report/performance.

         d) etc.

   c. Special training.

      1) Military training.

      2) Other training.

3. Job environment.

   a. Resources.

      1) Physical.

      2) Staff.

      3) Monetary.

b. Autocratic, democratic (i.e., degree of supervision and how perceived by employee).

c. Time constraints.

d. Problems that interfere with job performance, and evidence that problems exist.

HANDOUT 1-2

Types of Information-Gathering Questions

Two general classes of questions that can be asked to a respondent either on a questionnaire or in an interview.

Closed-end questions.

1. Description - generally can be answered by a given fact or facts because the question is usually very structured and may offer a limited number of possible responses.
2. Example - How many operators did you train last year?
3. Comments -
   - Good for obtaining factual information.
   - Good where there are few possible alternatives.
   - Responses are short and easy to record.
   - Most people will answer this type of question on a questionnaire.

Open-end questions.

1. Description - Unstructured questions for which any number of possible answers may be given depending upon the desires of the respondent.
2. Example - What are some of the things that you like best about your job?
3. Comments -
   - Useful for obtaining respondent attitudes, opinions, or perceptions.
   - Useful where the answer is not predictable.
   - Can be used in the early stages of information gathering to help formulate closed-end questions in later information-gathering stages.
   - Few people tend to answer these questions on a questionnaire.

HANDOUT 1-3

Pointers in the Design of a Questionnaire

1. Decide whether questionnaire is to be self-administered or used as the basis of an interview.
2. Questions should satisfy the goals of your inquiry.
3. Ask no more questions than are needed to provide the necessary information.
4. Phrase questions in language appropriate to your intended respondents, in a way which does not slant the response, and does not embarrass or place the respondent in an awkward position.
5. Number all questions and arrange them in a logical order.
   - Questions should be arranged by topic.
   - Questions should be arranged from the general to the specific.
6. Write complete and concise instructions; instructions should be written in different typeface than the questions.
7. Provide adequate space for writing answers.
8. Pretest your questions on a sample of peers or a small group of respondents.
9. To increase the rate of return:
   - Print on colored paper.
   - Address personally, if possible.
   - Follow-up by phone or another copy of the questionnaire.
   - Funnel questionnaires through one person, a supervisor, if possible.
   - Supply stamped, return envelope.

HANDOUT 1-4

Improving the Quality of Interview Data

Conducting a personal or telephone interview to the mutual satisfaction of both interviewer and interviewee is more than a simple matter of asking a number of questions. Following the suggestions below will help to improve the quality of the data you collect when conducting interviews.

1. Schedule the interview at the convenience of the interviewee. If you are conducting a telephone interview, indicate your purpose, the amount of time that the interview may take, and ask whether it would be more convenient to conduct the interview now or at some later time (to be specified by the interviewee).
2. Once an appointment for an interview has been set, don't be late.
3. Always explain the purpose of the interview clearly and concisely. An estimated 70% of people who are interviewed are not clear on what the purposes of the interview were at its conclusion.
4. Be natural, informal, courteous and attentive. Your undivided attention is the greatest compliment you can pay.
5. Make the interviewees feel that they are being consulted rather than being cross-examined on a witness stand.
6. Do not expect to talk more than 10% or, at most, 20% of the time. Your job is to listen.
7. Use the first part of the interview to determine the scope of the subject matter being analyzed, so you will be better equipped to obtain the data you need. Open-end questions, neutral responses, and pauses serve as prompts to get this general information. Closed-end questions will probably become necessary to establish factual data and follow-up information.
8. At the end of the interview, summarize the key points made in the interview. This lets the interviewee know that you have been listening and that you care enough about his/her contributions to make sure they were heard correctly. Summarizing will also provide the opportunity to correct or confirm your perceptions of what was said.
9. Don't be afraid to ask for clarifications or examples of statements that are not clear to you.
10. Don't be afraid of silence.
11. Express your gratitude to the interviewee for the time spent answering your questions. Leave the door open for possible follow-up conversation with the interviewee should the need for additional information or clarification arise.

HANDOUT 1-5

Advantages and Disadvantages of Data Collection Techniques

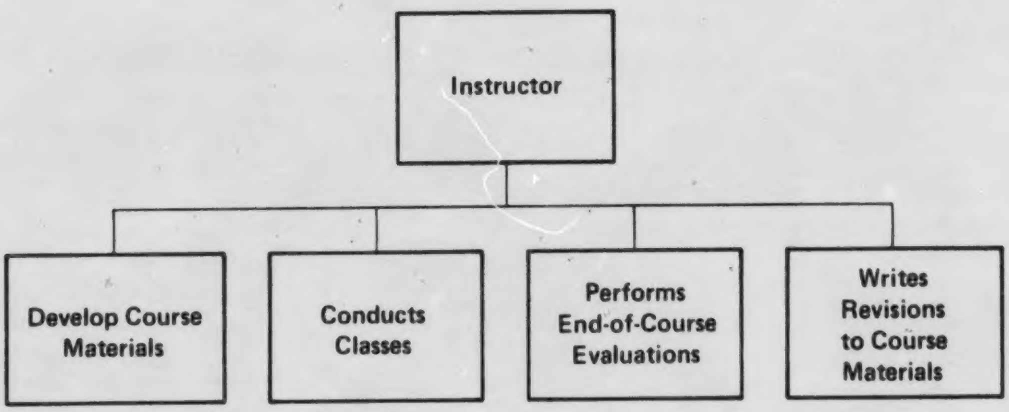
TECHNIQUE	ADVANTAGES	DISADVANTAGES
In-Person Interview	High response rate Provides most information for time spent Provides most accurate information Responses can be pursued to obtain greater detail	Costly in both time and money unless closely controlled Provides some extraneous information Requires trained interviewers Not all people are capable of being good interviewers May cause suspicion of motives
Telephone Interview	Less costly than in-person interviews (no travel time and expense) May be quickly conducted Easy to supervise	Less sensitive than in-person interviews Provides no non-verbal feedback Can be cut short by the interviewee Requires trained interviewers Requires pleasant voice (appearance may compensate for unpleasant voice in-person)
Questionnaire	Yields large amounts of information Does not require trained interviewers Restricts respondent to specific areas	Requires very explicit instructions Return rates tend to be less than 50% (especially if filled out on a person's own time) Group responding is required for a better return rate Provides opportuinity for collaboration among respondents Must build in an incentive so people will return questionnaire

Handout 1-5
Advantages and Disadvantages of Data Collection Techniques
Page Two

TECHNIQUE	ADVANTAGES	DISADVANTAGES
Observation	Establishes what people actually do, not what they say they do May be accomplished directly by trained observers or indirectly with automatic cameras Provides data on physical environment Can help pinpoint problem areas	Results comprise small sample of behaviors May be expensive and time-consuming Requires skilled observers Direct observation can bias worker performance
Document Review	Less costly than other methods Helps identify other areas and documents to analyze Requires little special training Allows a novice to become knowledgeable in the area being analyzed	Data collected may be incorrect if outdated material reviewed May bias the design of instruction

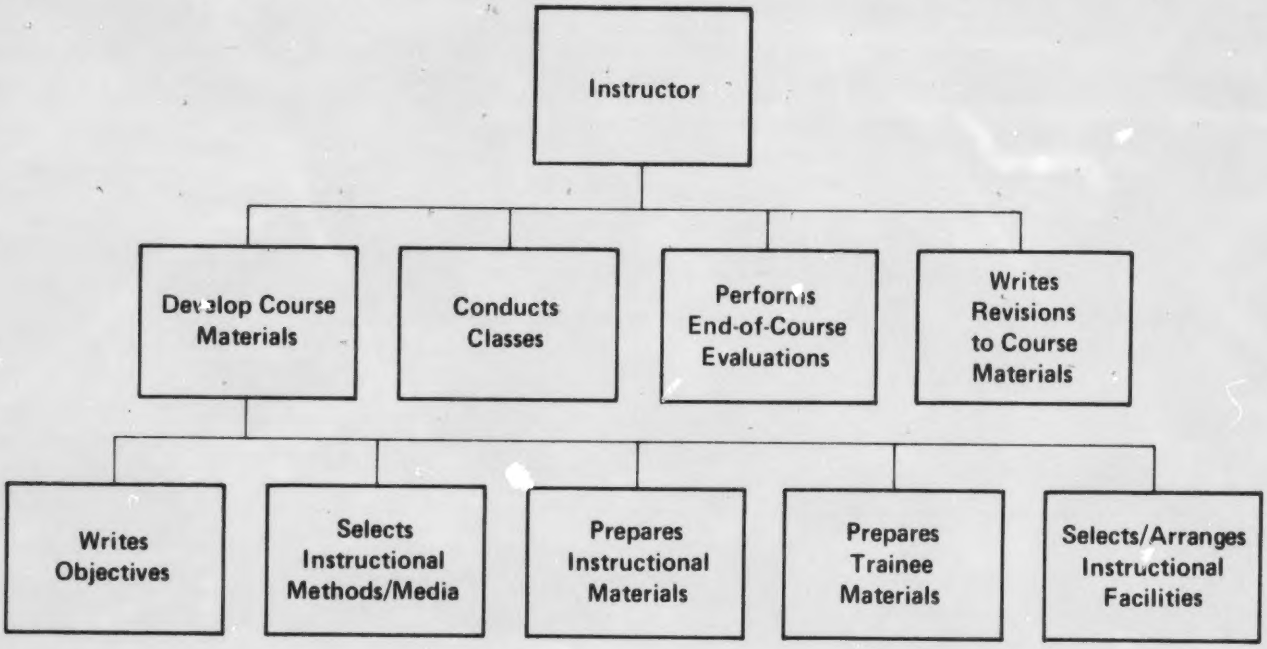
Overhead 1-6

INITIAL BREAKDOWN OF THE JOB OF INSTRUCTOR


Instructor
Develop Course Materials
Conducts Classes
Performs End-of-Course Evaluations
Writes Revisions to Course Materials

Overhead 1-7

SECOND-LEVEL BREAKDOWN OF THE JOB OF INSTRUCTOR



- Instructor
  - Develop Course Materials
    - Writes Objectives
    - Selects Instructional Methods/Media
    - Prepares Instructional Materials
    - Prepares Trainee Materials
    - Selects/Arranges Instructional Facilities
  - Conducts Classes
  - Performs End-of-Course Evaluations
  - Writes Revisions to Course Materials

Exercise 1-1

PART I. Indicate which task statements are written in GOOD form and which are written in POOR form by placing a check mark (✓) in the appropriate column.

	GOOD	POOR
1. Monitor flowmeter.		
2. Write daily work plan for all maintenance and operating personnel on the last day of each month.		
3. Demonstrate maintenance procedure.		
4. Score written tests.		
5. Understand question.		
6. Take hourly inspection tour.		
7. When you are lecturing to a class, make sure you speak clearly and audibly.		

PART II. Indicate which of the following task statements have described a task to the level of detail that skill and knowledge requirements can be identified.

	Not Enough Detail	Acceptable Detail	Too Much Detail
1. Place pencil point on paper.			
2. Prepare test answer key.			
3. Conduct class.			
4. Perform checmical analysis.			
5. Connect TV monitor to videotape playback unit.			

PART III. The following are listings of items needed to complete various procedures. Your group will be assigned one of these items. Write a set of task descriptive statements for the items assigned to your group. Write your task statements on your group's flip chart.

1. Given a cold water source, a water heating device, a jar of instant coffee, a teaspoon, an empty cup with saucer, a cup of sugar, a cup of nondairy creamer, and a pot, make a cup of coffee.

2. Given a box of cake mix, dozen eggs, a cold water source, measuring cups, hand mixer and bowl, wooden spoon, two cake pans, flour, stick of oleo, and an oven, make a cake (no icing).

3. Given a typewriter, a completed letter, an envelope, person's name and address, a stamp, and a mailbox, send a letter.

KNOWLEDGES: WHAT MUST BE KNOWN BEFORE A TASK CAN BE PERFORMED.

- THE LOCATION OF INTAKE PUMP.
- THE SIX PARTS OF A PUMP TO INSPECT.
- CHARACTERISTICS OF A PUMP THAT INDICATE A NEED FOR MAINTENANCE.
- THE FIVE STEPS REQUIRED FOR PUMP SHUTDOWN.
- THE PROCEDURES FOR REMOVING PUMP SEALS.

SKILLS: THOSE PHYSICAL OR PERCEPTUAL ACTIVITIES REQUIRED TO PERFORM THE TASK CORRECTLY.

- CAN DISCRIMINATE BETWEEN EXCESSIVELY HOT AND NORMAL HEAT RANGE OF A RUNNING PUMP.
- CAN DISCRIMINATE BETWEEN NORMAL AND EXCESSIVE VIBRATION OF RUNNING PUMP.
- CAN DISCRIMINATE BETWEEN NORMAL AND EXCESSIVE LEAKING OF WATER FROM A RUNNING PUMP.
- CAN USE COMMON HAND TOOLS.
- CAN DISCRIMINATE BETWEEN THE SOUNDS OF A NORMAL AND A CAVITATING PUMP.

THE TWO PARTS OF A TASK ANALYSIS ARE:

1. DETERMINE THE JOB PERFORMANCE REQUIREMENTS.
2. IDENTIFY SKILLS AND KNOWLEDGES WHICH UNDERLIE JOB PERFORMANCE.

Task Analysis Worksheet

(CONTINUATION PAGE)

Page 1 of 4

Task No. & Title: 8.0 Perform Pump Preventive Maintenance	Position Title: Operator	Analyst: J. Doe	Date: 4/79

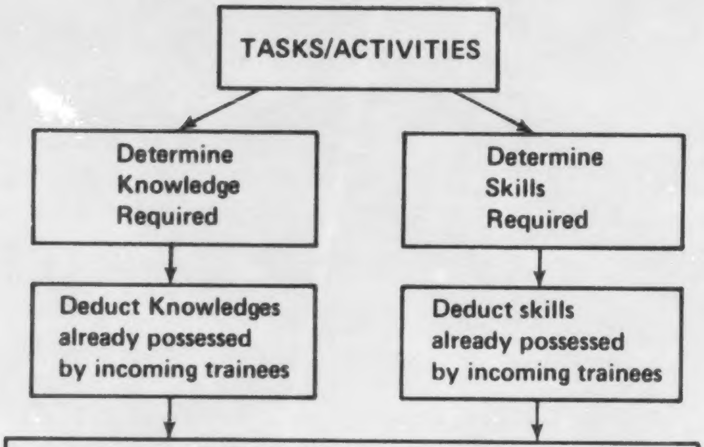
Task Details

No.	Activity	Skill/Knowledge Required	Notes
8.1	Perform routine inspections.	1. Knows: a. Pump locations. b. Pump parts. c. Characteristics of potential malfunctions.	Equipment schematics/model. Slides or old pumps may be used for early stages of learning.
		2. Can recognize hazardous characteristics when encountered. a. Visual discrepancies. b. Auditory discrepancies. c. Excess vibration. d. Electrical burning.	
		3. Knows immediate corrective action to take, if needed.	Stress safety.
8.2	Replace pump bearing.	1. Knows pump parts.	Manufacturer's SOP.
		2. Knows replacement procedure.	Demonstration.
		3. Can use hand tools.	
8.3	Replace pump seal.	1. Knows pump parts.	Manufacturer's SOP.
		2. Knows repair procedure.	Demonstration.
		3. Can use hand tools.	

TRAINING REQUIREMENTS ARE THOSE KNOWLEDGES AND SKILLS WHICH ARE:

- REQUIRED FOR PERFORMING THE JOB CORRECTLY.
- NOT ALREADY IN THE INCOMING TRAINEE'S REPERTOIRE.

Overhead 1-13



TASKS/ACTIVITIES

Determine Knowledge Required

Determine Skills Required

Deduct Knowledges already possessed by incoming trainees

Deduct skills already possessed by incoming trainees

TRAINING REQUIREMENTS

Knowledge to be trained for instructor tasks/activities. For example:

- Content facts
- Registration procedures
- Instructional methods
- General principles of reinforcement

Skills to be trained for instructor tasks/activities. For example:

- Develop speaking skills
- Load and operate 16mm film projector
- Write valid and reliable test questions
- Develop good questioning techniques

Required proficiency levels.

- Requirements for speed (e.g., projector loaded for operation within three minutes).
- Requirements for accuracy (e.g., choose the best instructional method correctly, not less than 90% of the time).
- Allowable error rates (e.g., reliability of tests should not fall below .80).

EXERCISE 1-2

Place a check mark (✓) next to the most appropriate alternative(s).

1. A former automobile mechanic has applied for a maintenance position at a large water treatment plant. Which of the following skills or knowledges is the applicant least likely to need addressed in training?

   _____ a. Basic pump familiarization.

   _____ b. Use of hand tools.

   _____ c. Water plant safety procedures.

   _____ d. Valve maintenance.

2. The Public Health Service has just issued new procedures for testing six common water elements. These new procedures are very similar to those already being used in your lab. You would like to have your experienced laboratory technicians learn the new procedures. Which of the below represents the most appropriate and efficient training requirement?

   _____ a. Knowledge of the existing procedures for testing.

   _____ b. Knowledge of those particular steps in the procedures which are new.

   _____ c. Knowledge of each of the steps of the new procedure.

   _____ d. Knowledge of the rationale for changing the old procedures.

3. You have just purchased a new integrated carousel slide/tape projector/recorder unit for use in your classrooms. You wish to provide some training for your instructors in the operation of the unit. You also want to make them aware of the slide/tape packages available for use in training water supply operators. Your instructors routinely use carousel projectors to show slides they have taken themselves, and provide their own narration. Which of the skills and knowledges below would not be appropriate training requirements?

   _____ a. Knowledge of how to load a cassette into the new unit.

   _____ b. Knowledge of the advantages of using slide/tape packages.

   _____ c. Knowledge of optimal projection distances for the unit.

   _____ d. Knowledge of how to correctly place a slide into a standard carousel.

4. A water plant supervisor job has as one of its task statements, "writes work order requests." The knowledge of how to correctly complete a work order request form should be least likely as a training requirement for which of the following applicants?

_____ a. A former English teacher.

_____ b. A former service station attendant.

_____ c. A former owner/manager of a small hardware store.

_____ d. A former maintenance shift supervisor at a large surface mine.

LESSON TITLE:

Lesson 2. Writing Useful Training Objectives

PURPOSE:

To provide participants with the skills and knowledges required to write behavioral oriented training objectives.

TRAINING OBJECTIVE

GIVEN:

1. A list of objectives.
2. Results of a needs analysis and derived training requirements.

ACTION:

1. Participants will identify objectives as good or poor, and list the reasons for the choice.
2. Participants will write objectives to satisfy the requirements.

STANDARD:

1. With 100% accuracy.
2. Objectives will be written in behaviorally referenced format with three identifiable parts, and will address all training requirements.

INSTRUCTIONAL TECHNIQUES:

Self-instructional reading

PARTICIPANT MATERIAL:

Self-instructional reading

INSTRUCTIONAL MATERIAL:

REFERENCES:

TIME:

3 hours

ACTIVITIES:

1. Self-instructional reading
2. Individual exercise
3. Group discussion
4. Group exercise
5. Review

75

INSTRUCTIONAL EVENTS

I. EARLY STAGE

Self-instructional reading explaining the process of writing behavioral objectives.

II. INTERMEDIATE STAGE

Application of principles found in the self-instructional reading to simple objective writing exercises.

III. FINAL STAGE

Groups will apply principles to prepare objectives for a unit of instruction (i.e., evening class; one lesson; three classes, etc.).

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	I. The next step in the development process is to actually write training objectives. Explain that the skills and knowledges that the trainee does not possess that are required to perform the job are now known, and that training objectives will be written to address those areas. (Self-Instructional Reading #1.)	Self-Instructional Reading #1
	1. Have participants turn to the reading assignment for Lesson 2, Writing Useful Training Objectives.	
	2. This technique of presenting content is used to give participants an example of one alternative to lecturing.	
	3. Explain that the subject matter for this section is contained in the reading assignment. Topics included are:	
	a. Characteristics of good training objectives.	
	b. Exercises.	
	4. Assignment: Participants are to read the material in class and complete Exercise 2-1, at the end of the assignment.	Exercise 2-1
	5. Answers to the questions will be discussed when everyone has completed the assignment.	
	6. Have participants begin reading assignment. Allow 15-20 minutes.	
	7. Discuss the results of Exercise 2-1, provide feedback as necessary.	
	8. Summarize the key points regarding the writing of objectives.	
	a. Objectives are written to reflect the skills and knowledges required to perform tasks identified as training requirements.	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	b. Three parts of a well-stated objective. 1) Given (condition)--under which the action must be performed. 2) Action--what the trainee is to do. 3) Standards--by which the action will be judged.	Overhead 2-1
	III. Summary. Summarize the steps taken to derive sound training objectives. A. Establish whether the need for training is indicated. B. Determine trainee capabilities. C. Perform Job Task Analyses: 1. Breakdown the job into tasks. 2. Breakdown tasks into steps. 3. Identify skills and knowledges required to do each task. D. Derive training requirements by subtracting incoming skills/knowledges from those required to do the job. The remainder constitute the training requirements, i.e., training is provided only for those skills/knowledges trainees need and do not currently possess. E. Write training objectives.	Overhead 2-2
	IV. Review the requirements for Exercise 2-2. (Optional) A. NOTE: If possible, the participants should develop one set of training objectives to be mastered by their students. These objectives can be derived from the background materials they have brought with them to the workshop.	Exercise 2-2 [See note on Exercise 2-2.]

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	B. Indicate that each person is expected to prepare the following products for the water plant course he/she currently teaches, on which they have the background information. 1. A complete listing of training objectives to be accomplished by their students. 2. All objectives are to be written in three-part format. C. Indicate that there is a two-hour time limit for this exercise. D. Explain that the instructors are available as resource persons. E. Review exercise products when completed.	

Answers for Exercise 2-1

OBJECTIVE	GIVEN(S)		ACTIONS(S)		STANDARD(S)	
	Good	Poor	Good	Poor	Good	Poor
1. Upon completion of this assignment, participants will understand how to write training objectives with a minimum of errors.	X			X Poor Verb Choice		X "Minimum" Undefined Term
2. Given a legible handwritten draft of a report, trainee will type the report without error at a minimum of 20 pages per day.	X		X		X	
3. For a given list of chemicals, students will be aware of the MCLs for each.	X			X Poor Verb Choice	X	
4. Trainees will perform the correct tests for inorganic chemicals.		X No Condition Given	X			X No Standard Given
5. Using a nephelometric turbidimeter, trainees will demonstrate how to test for turbidity by accurately following the standard operating procedure.	X		X		X	

Answers for Exercise 2-1
Page Two

6. Select two of the objectives from Exercise 2-3 with a "poor" rating on one or more parts, and rewrite them in the correct form of a training objective.

7. Write a training objective to reflect the operator task "replace valve seal."

INSTRUCTIONAL MATERIALS

Lesson 2. Writing Useful Training Objectives

Self-Instructional Reading #1

Training Objectives

We all have shared the experience of being a student. This is an important perspective to keep in mind when developing training courses. Think back to those courses you have taken where there was a misunderstanding as to what the instructor wanted from the students. The instructor lectured on one thing and tested on another. Or remember the course you signed up for because it sounded like it would be beneficial. Halfway through it, however, you found yourself heading in the opposite direction from where you had intended to go. The course had no clear goal or purpose.

These and other similar problems you have encountered as students are the problems you, as instructional designers, should strive to avoid. You must establish early, for the students and yourself, a clear understanding of where the training is going and what is expected of all concerned.

One way to approach this type of situation is to perform a task analysis of the job, and derive the training requirements. With this information in hand, you can begin writing clear statements of what the student should be able to do when the training is completed. These statements should reflect the skills and knowledges required to perform tasks identified in the task analysis. They also should be written to clearly specify what the student is to do, under what conditions, and how his/her performance is to be judged. These statements are course objectives and, if written in terms of what the student is to do, they are training objectives.

It is important to establish training objectives early in the developmental process. Remember that it is the student who must benefit from the course. You may also wish to write objectives for the instructor that will specify what he/she is to accomplish within the time frame of the course.

Examples of instructor objectives might be to demonstrate the following procedures: (1) sampling for turbidity, (2) sampling for coliform bacteria, etc. These types of objectives are for the instructor's benefit only, and should be included in the lesson plans. Your primary emphasis, however, should be on writing good training objectives for your students, stated in terms of what the student will be able to do at the end of training.

Training objectives are beneficial in that they:

1. Establish clear-cut instructor and student goals.
2. Provide a firm basis for development of performance measures (tests).
3. Permit selection of the most suitable instructional techniques.

In order for a training objective to fulfill those expectations, it must consist of three parts. The three parts of a well-stated training objective are:

1. The Action (or behavior)--what the student is to do.
2. The Given--what the student will be given to facilitate his/her action.
3. The Standard--how well and how quickly the student has to do it.

You can use these three parts as guidelines for writing training objectives by making yourself a chart similar to the one found in Figure 1.

	TRAINING OBJECTIVES			
	GIVEN(S)	ACTION(S)	STANDARD(S)	
TASK 1				
TASK 2				

Figure 1. Sample Matrix for Use When Writing Training Objectives

Then, taking each task, ask yourself the following questions:

1. What has to be done?

ACTIONS

2. Can this be done in class?
3. If it cannot, what is the next-best student activity that will approximate this experience? (e.g., practice sessions at a water plant).

GIVENS 4. What do I have to provide for the student to assure that he/she can perform the action?

STANDARDS 5. How well does the action have to be performed? (e.g., with no errors, or within five minutes).

Fill in the chart with the answers to these questions. When you join all the information together, you will have a training objective for that task.

Now let's look at each individual part of a well-stated training objective.

GIVEN	ACTION	STANDARD
A sample of five tasks of a water plant operator.	Student will write a training objective for each task.	Within 20 minutes, with all three elements present--the given, the action, and the standard.

Action

An instructor cannot read the mind of the trainee to see how well he/she understands. Only through some observable activity of the trainee can the extent of his/her knowledge or skill be measured. Therefore, the "action" part of the objective should specifically state what the trainee must do to to demonstrate his/her learning. The objective should be stated so that everyone knows what the trainee must learn to meet the objective.

In order to specifically state what the trainee should be able to do at the end of training, you must use the proper verbs--action verbs. Examples of action verbs are: solve, compare, adjust, label, etc. (See Table 1.) Using action verbs reduces ambiguity. For example, "Know how to use a 35mm slide projector" is an ambiguous objective. It can be interpreted in many ways. One person may feel that the trainee's reciting the operating procedure for the slide projector indicates knowledge. Another person may say that the trainee should be able to actually operate the projector. Unless you specify trainee behavior with an action verb, he/she may learn something other than what you intended.

The verbs you select should reflect actions that are observable, measurable, verifiable, and reliable. They should not be open to interpretation. For example, it is difficult to objectively measure or verify how much someone enjoys or understands something. Avoid using such verbs

Table 1

Suggested Action Verbs

SIMPLE

- associate
- give a word for
- identify
- indicate
- label
- match
- mate
- name
- repeat
- reply
- respond
- say
- specify

- activate
- adjust
- align
- close
- copy
- (dis)assemble
- (dis)connect
- draw
- duplicate
- grasp
- insert
- lift
- load
- locate
- loosen
- manipulate
- measure
- move

- open
- operate
- pick up
- press
- pull
- push
- remove
- replace
- rotate
- set
- slide
- signal
- stencil
- tighten
- trace
- tune
- turn off-on
- twist

- cite
- copy
- enumerate
- itemize
- letter
- list
- quote
- record
- reiterate
- repeat
- reproduce
- (re)state
- tabulate
- transcribe
- type
- write

- choose
- compare
- contrast
- couple
- decide
- detect
- differentiate
- discern
- distinguish
- divide
- isolate
- judge
- pick
- recognize
- select

COMPLEX

- allocate
- arrange
- assign
- characterize
- categorize
- catalogue
- classify
- collect
- compile
- file
- grade
- group
- index
- inventory
- mate
- order
- rank
- rate
- sort

- anticipate
- calculate
- calibrate
- check
- compute
- conclude
- convert
- coordinate
- correct
- deduce
- define
- demonstrate
- determine
- diagram
- equate
- estimate
- evaluate
- examine
- expect

- explain
- extrapolate
- figure
- foresee
- generalize
- illustrate
- infer
- interpolate
- interpret
- monitor
- organize
- plan
- predict
- prescribe
- program
- project
- schedule
- translate
- verify

- accommodate
- adapt
- adjust to
- analyze
- compose
- contrive
- construct
- correlate
- create
- design
- develop
- devise
- diagnose
- discover
- find a way
- invent
- realize
- reason
- resolve
- study
- synthesize
- think through
- troubleshoot

NOTE: This list is provided as a guide, and is not to be considered all-inclusive.

when writing objectives. Instead, use the best possible action verbs that satisfy the general criteria of being observable, measurable, etc., and that are appropriate to the task performance and training measurements.

Think of some other examples of "good" verbs to use when stating training objectives, and think of some other "poor" verbs you should avoid using. Write three examples of each under their appropriate heading. Compare your examples with those found in Table 1 on page 4 of this reading assignment.

"GOOD" VERBS	"POOR" VERBS
1.	1.
2.	2.
3.	3.

Ideally, the outcome behavior of your objective will be the same as the job behavior (skill or knowledge you identified as a training requirement). If job behavior involves filling out Form A, the objective's action should involve an opportunity to fill out Form A. The objective will allow trainees to practice job behaviors in a supervised learning environment.

What about those job behaviors which cannot be duplicated in the training environment because of safety, economic reasons, or other practical considerations? For example, one job behavior required of astronauts might be to "walk around on the moon for extended periods of time without harming themselves or damaging their equipment." Clearly, it is impossible to exactly duplicate the behavior in training. In cases such as this, the principle to be remembered is: The resulting training behavior should be as close as possible to the job behavior. One way to solve the astronaut's training predicament is to determine the conditions of the training environment, and state the training objectives as follows:

> "Given a simulated moon environment, space suit, etc., the astronaut will walk around for . . .

Job-related objectives for training new operators may include:

1. From a flow diagram of a treatment plant, determine the number of inlet and outlet pumps.
2. From a list of common water contaminants, check those which are ineligible for an exemption from SDWA requirements.

3. For turbidity and microbiologicals, write the number of monitoring samples required by the SDWA per month for a water treatment plant serving 10,000 people.

Givens

As you have seen in the three previous examples, there is a need to clearly state the limits and/or conditions of trainees' performance when writing training objectives. To help you determine the conditions to set for your objectives, you must consider a number of things. For example, has the trainee had prior experience or training? What materials or equipment will the trainee have to work with? Can he/she select tools to be used, or use notes taken on the subject? In the "givens" portion of the objective you must specify the objects, events, human behaviors, words, or symbols which will be presented to the trainees at the time that they are to perform. You will be setting the stage for trainees' performance and you will want the stage to resemble the job conditions as much as possible.

Goals to keep in mind when writing the "givens" part of an objective are:

1. State the conditions imposed upon the student (e.g., Given a list of verbs, trainee will check those which are action verbs.)
2. Establish the working conditions (e.g., Using available NTOTC resources, prepare a one-hour unit of instruction on writing behavioral objectives.)
3. Don't overuse the word "given;" use variations (e.g., From a specified list of verbs, trainee will select those which are action verbs.)

Which of the following are examples containing clearly stated conditions?

1. Given a chemical formula, students will calculate the proper proportions of the reactants.
2. Using only the six tools in a specified tool box, trainees will repair a high speed pump.
3. Given enough time, students will learn to appreciate the importance of meeting the standards for MCLs set by EPA.
4. Trainees will complete Form A within five minutes.

The first two are examples of clearly identifiable conditions (or limits) imposed upon the trainees. Number three, "Given enough time. . ." is such a vague statement that it denies the imposition of any conditions or limits. The fourth statement does constitute a limit but cannot to be considered a condition to be imposed upon the trainees. It is not something the trainees have to work with, but a constraint to perform within or a goal to reach. The fourth example illustrates the third part of an objective--the standard.

Standards

The third requirement for a well-prepared objective is a clearly stated (or clearly implied) standard of performance. The standard of performance is designed to measure how well the trainee performs the specified action(s). The criteria for standards are that they be both complete and accurate.

When writing objectives, you must determine which type of standards the trainees will have to meet. Six types of standards are summarized for you in Table 2.

When writing standards, try to measure the behavior as objectively as possible. It is much easier to determine if trainees are meeting the standards if the resulting behaviors can be observed and verified (quantified) by another instructor, student, supervisor, etc. Examples of verifiable standards are:

1. From a list of 30 common water pollutants, identify those six for which maximum contaminant levels have not been established by EPA.

2. Perform the five steps of the chlorine residual test procedure in the correct sequence without error, within ten minutes.

There are times when the actions to be measured are subjective and difficult to evaluate. You will not be able to verify the standard for these situations. Examples of these are: "maintain positive working relations with supervisors," or "answer customer complaints courteously." Since these actions result in ambiguous objectives, it is suggested that you try to avoid such action statements. Verify your standards wherever possible.

Table 2

Types of Standards

DESCRIBE STANDARDS BY:	EXAMPLE:
1. Referring to a standard regulation or operating procedure.	1. Using available lab facilities, operator will perform analysis by standard methods for alkalinity and ph.
2. Implying the standard of NO ERROR.	2. Given a list of chemical feeds, operator will correctly identify the function of each.
3. Specifying minimum acceptable level of performance.	3. Operator will be able to recite, from memory, five of the eight major provisions of the Primary Regulations of the SDWA.
4. Specifying time requirements.	4. Given the flow rate for a treatment plant and a low chlorine reading, trainee will compute the amount of liquid chlorine to be added to bring the system to a given standard. Computations must be completed within three minutes.
5. Specifying rate of production.	5. Operator will perform routine maintenance and inspections once each day.
6. Specifying qualitative requirements.	6. Operator will maintain good public relations with the customers served. Public relations will be considered good if the following conditions are present over a six-month period: (a) no customer complaints. (b) no adverse media reports, etc.

For each of the following job conditions, specify the standard to use. (Refer back to Table 2, page 8 for the various types of standards.)

CONDITIONS OF JOB	STANDARD(S) OF JOB
1. Complex procedures for which definite regulations are prescribed by law.	1.
2. Any activity when time is a critical factor.	2.
3. Using formulas or procedures in which the results are dependent upon complete accuracy.	3.

The answers you should have chosen are: 1) standard regulation or operating procedures, 2) time requirements, and 3) no error. If you chose these answers, good for you. If you did not, reread the section on standards and/or discuss your answers with the instructor during the discussion session which will follow this assignment.

Now that the basic principles underlying the preparation of training objectives have been reviewed, you should check your undrstanding of those principles by performing Exercise 2-1 on the next two pages. We will review your answers when all participants have completed the exercise.

Exercise 2-1

	GIVEN(S)		ACTIONS(S)		STANDARD(S)	
OBJECTIVE	Good	Poor	Good	Poor	Good	Poor
1. Upon completion of this assignment, participants will understand how to write training objectives with a minimum of errors.						
2. Given a legible handwritten draft of a report, trainee will type the report without error at a minimum of 20 pages per day.						
3. For a given list of chemicals, students will be aware of the MCLs for each.						
4. Trainees will perform the correct tests for inorganic chemicals.						
5. Using a nephelometric turbidimeter, trainees will demonstrate how to test for turbidity by accurately following the standard operating procedure.						

6. Select two of the objectives from Exercise 2-3 with a "poor" rating on one or more parts, and rewrite them in the correct form of a training objective.

7. Write a training objective to reflect the operator task "replace valve seal."

Overhead 2-1

THREE PARTS OF A GOOD TRAINING OBJECTIVE:

GIVEN	ACTION	STANDARD
Where is the trainee to perform the action? and . . .	What is the trainee to do?	How well is the action to be performed?
What equipment or aids will be given to assist, if any?	a. derived from task description. b. observable	a. how fast? b. how accurately?

UNIT SUMMARY: ESTABLISHING OBJECTIVES

1. ESTABLISH THE NEED FOR TRAINING.
2. DETERMINE TRAINEE SKILLS AND KNOWLEDGES.
3. DETERMINE JOB REQUIREMENTS (TASK ANALYSIS)
    a. BREAK JOB INTO TASKS
    b. IDENTIFY SKILLS AND KNOWLEDGES.
4. DETERMINE WHAT SKILLS AND KNOWLEDGES ARE TO BE TRAINED. (TRAINING REQUIREMENTS)
5. WRITE TRAINING OBJECTIVES.

EXERCISE 2-2, INSTRUCTIONS

NOTE: The purpose of this exercise is to give the participants an opportunity to write training objectives for their own courses. In preparation for this, the workshop announcement should request that they bring background materials on any/all of topics in water plant operations they currently teach. These can be used as starting points for the individuals, and can also be used for discussion among the group.

Instructions

Given your knowledge of the plant operators whom you train in your area, and the background materials you have brought with you, it should be possible for you to define the training required for your operators. Remember the equation you use to identify training requirements.

X = Job performance requirements
-Y = Entering skills/knowledges of trainees
Z = Training requirements

Task

Your task is to develop a set of training objectives for a course/lesson you currently teach. These objectives will be derived from the specific tasks you know must be performed by the water plant operator, and your own perceptions of the existing skills/knowledges of plant operators in your area.

Exercise Product:

1. A complete list of training objectives to be accomplished in the course/lesson you have chosen. All objectives are to be written in the three-part format of GIVEN, ACTION and STANDARD.
2. A course outline showing how you will sequence those objectives, with delivery time assigned to each instructional activity leading to students' achievement of the objective.

Time:

You have ____ hour(s) to complete this exercise. (A function of time available and the number of objectives that you desire to have prepared.)

LESSON TITLE:

Lesson 3. Sources of Operator Training Materials

PURPOSE:

1. To familiarize participants with the various types of resource considerations which must be made in the design of an instructional program.
2. To familiarize participants with the procedures for acquiring water quality educational materials from NTOTC's, IRIS and IRC programs.

TRAINING OBJECTIVE

GIVEN:

1. & 2. Following a lecture/discussion of the various dimensions of instructional resources.

ACTION:

1. Participants will review resources available for use in the development of water plant operator training.
2. Identify the source locations of training programs, videotapes and slides and the procedures for obtaining them.

STANDARD:

1. Participants will make optional use of available resources. They will not plan to use resources which are not available, nor will they fail to use resources which are available which are appropriate for water plant operator training.
2. Participants will cite the correct locations and procedures for obtaining instructional materials with 100% accuracy.

INSTRUCTIONAL TECHNIQUES:

1. Lecture/Discussion
2. Demonstration

PARTICIPANT MATERIAL:

1. Participant's Handbook
2. Handouts:
   a. EPA course descriptions
   b. NTOTC course offerings
   c. NTOTC packaged course listings
   d. Basic Instructor Training Materials
   e. Drake University Instructor Training Manual
   f. NTOTC IRC Catalogue
   g. NTOTC IRIS User's Guides

INSTRUCTIONAL MATERIAL:

1. Overhead transparencies/projector
2. Handouts:
   a. EPA course descriptions
   b. NTOTC course offerings
   c. NTOTC packaged course listings
   d. Basic Instructor Training Materials
   e. Drake University Instructor Training Manual
   f. NTOTC IRC Catalogue
   g. NTOTC IRIS User's Guides

REFERENCES:

TIME:

1 to 2 hours

ACTIVITIES:

1. Lecture/Discussion
2. Demonstration

INSTRUCTIONAL EVENTS

I. EARLY STAGE

Instructor presentation reviewing instructional resources to be considered prior to preparation of training materials and instructor lecture detailing the procedure for:

1. Accessing information in IRIS.
2. Accessing materials in IRC.

II. INTERMEDIATE STAGE

1. Instructor lead discussion of each instructional resource, to expand and complete the itemization of resources.

2. Instructor lead demonstrations of accessing IRIS, and IRC information.

III. FINAL STAGE

1. Participants will use the instructional resources itemized to determine the available resources for developing materials for operator training.

2. Participants will be able to search IRIS for information and identify locations, constraints and procedures for obtaining water plant operator training instructional materials.

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	I. Introduction.	
	A. Explain that all the instructional development steps taken thus far have resulted in completed specifications for the intended training course.	
	B. Before actual preparation of materials begins, a trainer should carefully review his/her resources to determine if there are ways to shorten development time or to determine whether there are lack of resources which will act as constraints upon development.	
	C. Review of resource at this time will permit modifications to the training specifications.	
	D. In this unit, we will review various dimensions of resources to identify those which may help or hinder training development, as well as specific resources which may aid development.	
	II. Development. (This section can be conducted either as a lecture or as a group discussion, depending on time available.)	
	A. Briefly review the checklist of dimensions to be considered on Overhead 3-1.	Overhead 3-1
	B. Explain that each of these dimensions will be considered briefly and individually.	
	1. Time. Encourage participants to make notes on the overhead in their book as each topic is discussed.	Overhead 3-2
	a. Development time. Is it short (30-45 days) or long? Impacts on the type of materials you can prepare.	
	b. Course length. Total hours short or long? 4 hours or 40 hours.	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	c. Class schedule. How are classes divided? One per week, two consecutive days? Retention factor to be considered.	
	d. Class time. How long is a single class? One hour, two hours? How much material can you anticipate covering in one class?	
	e. Ask if there are other time constraints and add to list.	
	2. Cost. Have class review Overhead 3-3.	Overhead 3-3
	a. Development budget. How much money for:	
	1) Personnel support for development.	
	2) Audiovisual development.	
	b. Capital expenses. Is there money for:	
	1) Purchase of video tapes/equipment?	
	2) Films.	
	3) Slide/tapes.	
	4) Audiovisual equipment.	
	5) Demonstration equipment.	
	c. Maintenance expenses.	
	1) Replacing expendables such as glassware in a lab course, forms, projector bulbs, reagents, test kits, etc.	
	2) Fees for guest lecturers.	
	3) Film/equipment rentals.	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	4) Transportation for field trips.	
	3. Development/Instructional Staff. Review Overhead 3-4.	Overhead 3-4
	a. Development staff.	
	1) How many are available to work on preparing materials? How long do you have?	
	2) What are their respective areas of expertise?	
	b. Instructional staff.	
	1) Affiliation. Do you have instructors on state staff, vocational schools, universities, Regional offices, AWWA, RWA, consulting engineers, water plant personnel.	
	2) Number. How many are available, and when?	
	3) Expertise. Who is best at what?	
	4. Instructional Facilities/Equipment. Review Overhead 3-5.	Overhead 3-5
	a. Location. Will it be far from trainee population? Will this impact on breaks, starting/quitting times.	
	b. Physical characteristics. Size, seating, lighting, temperature and noise control.	
	c. Equipment. Screen, projectors, projector tables, outlets, window blinds, lab equipment, vent fan, etc.	
	5. Pre-Developed Materials.	Overhead 3-6
	a. Completed courses.	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
7	1) EPA-sponsored course. Refer participants to Handout 3-1, explain that the Handout contains information about each of the six EPA-developed courses and is present for their review for possible reference to state training. Have participants look over the handout for a few minutes and answer any questions that may arise.	Handout 3-1
	2) Indicate that there is a national storehouse of water/wastewater training resources operatd by EPA and located in Cincinnati, called the National Training and Operational Technology Center (NTOTC).[1]	Overhead 3-7
	a) Establish the number of people aware of NTOTC and its operations.	
	b) Briefly list NTOTC services in the area of training. . Provides training. . Develops courses and materials.	Overhead 3-8

---

[1] NOTE: Requests for NTOTC materials referenced should be made directly to:

National Training and Operational Technology
Center
Office of Water Program Operations
U.S. Environmental Protection Agency
Cincinnati, OH 45268
Phone: 513/684-7503
Miss Eileen Hopewell

Allow sufficient time for delivery of materials.

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	- Reviews and stores water/wastewater documents related to training.	
	- Maintains a lending library of instructional materials and media.	
	c) Indicate that each of these services may be valuable to each trainer at one time or another and that we shall review each briefly.	
	3) NTOTC Training Courses.	
	a) Conducted primarily on-site in Cincinnati.	
	b) Distribute catalog of current course offerings. Indicate that dates, content, and cost is presented for each course.	NTOTC Course catalogs
	4) NTOTC Development of Courses.	
	a) Distribute a listing of NTOTC-developed courses which are available to water/wastewater trainers.	NTOTC Course listings
	b) Distribute the materials from the current Instructor Development course being developed by NTOTC. (The Basic Instructor Training Course.)	Basic Instructor Training Manuals.

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	c) Indicate that an advanced Instructor Training course was developed under NTOTC by Drake University and forms part of the workshop references.	Drake University Instructor Training Manual
	d) Course development is an ongoing activity at NTOTC.	
	5) Provide a brief description of IRIS.	Overhead 3-9
	a) Name: Instructional Resources Information System (IRIS).	
	b) Is an information base containing current pollution control trianing and educational materials.	
	c) Can provide trainers with a search for available materials in a given subject area, abstracts of potentially useful documents for review, access to audiovisual materials, and much more.	
	d) Explain that information from IRIS may be obtained through either an abstract or a full document. (Overhead 3-10).	Overhead 3-10
	e) Explain that the full collection of IRIS Abstracts are available:	Overhead 3-11
	. on Microfiche (3"x5" sheet of acetate film requiring a reading machine many of which are available at state offices, public or university libraries).	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	. as a bound document, or . on computer tape.	
	f) Each of these forms of IRIS may be obtained from ERIC/SMEAC for nominal charges as indicated on Overhead 3-11.	Overhead 3-12
	g) If you do not want to search the IRIS abstracts for educational materials pertaining to a particular subject, ERIC/SMEAC will conduct a computer search of the IRIS files upon written request, charging only for computer time.	Overhead 3-13
	h) Explain what information is pulled out of a document.	Overhead 3-14
	i) Explain what is included in the Descriptive Summary.	Overhead 3-15
	j) Explain the locations of the information on a computer printout.	Overhead 3-16
	k) A search of IRIS Abstracts will give you an idea of which documents may be helpful in developing operator training. If you now want to read the full document based upon what you have read in the abstract, the full document may be obained from: . college libraries	Overhead 3-17

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	. ERIC/SMEAC . Instructional Resources Center (IRC) of NTOTC (a description of IRC follows). . or from the source referenced in the IRIS Abstract. (In many cases the only place copyrighted materials can be obtained, other than public or school libraries.)	
	l) Notice that instructional materials that have accompanying audio-visual materials are available only through IRC or the source referenced in IRIS.	Overhead 3-18
	m) Review exactly what is available from these sources and their costs as indicated on Overhead 3-17.	
	n) Distribute IRC Lending Library Catalogs. (Available from NTOTC-IRC at no charge) and explain IRC borrowing/duplicating procedures. Briefly review catalog entries. . Page v--Table of Contents: types of AVs available. . Includes numerical index and descriptive abstracts. . Page 77--Duplication and loan information.	IRC Catalog.

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	. Page 81--Loan requests.	
	o) Answer any questions regarding NTOTC, IRIS OR IRC.	
	c. Other pre-developed materials from:	
	1) Manufacturers of equipment, or products.	
	2) Textbooks, programmed instructional materials.	
	6. Community Resources.	
	a. Review Overhead 3-19.	Overhead 3-19
	b. Water plants. Used for performance testing, field trips, job-related instructions.	
	c. Vo-tech schools. Check for related programs, courses, materials.	
	d. Libraries. Public, school, university, libraries may have texts, etc. of use in materials preparation.	
	e. Trainees. Some trainees may be counted on to provide small group instruction.	
	f. Environmental Training Centers are available in many states.	
	III. Summary.	
	A. Before actually beginning preparation of courses, carefully assess all resources which may significantly reduce development time or influence the specifications you have written for training.	
	B. Remind participants of the resources available through EPA Headqurters and the Regional Office.	

INSTRUCTIONAL MATERIALS

Lesson 3. Sources of Operator Training Materials

INSTRUCTIONAL AND DEVELOPMENTAL RESOURCES CHECKLIST

- TIME
- COST
- DEVELOPMENT STAFF
- INSTRUCTIONAL STAFF
- INSTRUCTIONAL FACILITIES/EQUIPMENT
- PRE--DEVELOPED MATERIALS
- COMMUNITY RESOURCES

TIME

- DEVELOPMENT TIME
- COURSE LENGTH
- CLASS SCHEDULE
- CLASS TIME
- OTHER TIME CONSTRAINTS

COST

- DEVELOPMENT BUDGET
- CAPITAL EXPENSES
- MAINTENANCE EXPENSES

DEVELOPMENT STAFF

- NUMBER
- EXPERTISE

INSTRUCTIONAL STAFF

- AFFILIATION
- NUMBER
- EXPERTISE

INSTRUCTIONAL FACILITIES/EQUIPMENT

- FACILITY LOCATION
- PHYSICAL CHARACTERISTICS OF FACILITY
- FACILITY EQUIPMENT

PRE–DEVELOPED MATERIALS

- COMPLETE COURSES
- AUDIO VISUALS
- OTHER

SIX OFFICE OF WATER SUPPLY COURSES

(HANDOUT 3-1)

Title of Course	Intended Audience	Length	No. of Course Components	Visual Aids	No. of Units	Pre-Test Post-Test	Pre-Course Activities	Equipment	Objectives	Instructional Methods	Bibliography	End of Course Evaluation
Principles and Practices of Water Supply Operations	Water Supply Operators	100 Hrs.	3—Instructor's Manual Solutions Manual Student Handbook	Slide/Tapes	5 Volumes: V1— 4 Modules V2—10 Modules V3— 9 Modules V4— 5 Modules V5— 3 Sections	No	Unknown	Yes (What, Unknown)	Yes	Unknown	Yes	Unknown
Sanitary Surveys of Non-Community Water Supplies	State and Local Agency Personnel	5 Days	2—Instructor's Manual Participant's Handbook	16mm Movie 35mm Slides Overheads (Diagrams Maps)	14	Yes	Yes— Logistics Checklist Provided	Check List Provided (Lab Equipment)	Yes	–Demonstration –Lecture/ Discussion –Role-Play	No	Yes
Methods for the Determination of Chemical Contaminants in Drinking Water	Chemists, Lab Technicians	5 Days	2—Instructor's Manual Participant's Handbook	Slide/Tapes 16mm Movie Overheads Video Cassettes	3	Yes	Yes— Well Documented	Extensive Lab Equipment	Yes	–Lecture/ Discussion –Demonstrations –Group Participation –Laboratory Practice	Each Unit Lists References	Yes

SIX OFFICE OF WATER SUPPLY COURSES
(HANDOUT 3-1, CONTINUED)

Title of Course	Intended Audience	Length	No. of Course Components	Visual Aids	No. of Units	Pre-Test Post-Test	Pre-Course Activities	Equipment	Objectives	Instructional Methods	Bibliography	End of Course Evaluation
Variances and Exemptions	State and Regional Water Supply Officers	2½ Days	2–Instructor's Manual Participant's Handbook	Overhead Transparencies	8	Yes–Pre-Test Only	Yes	Yes Checklist Provided	Yes	–Lecture –Group Discussion –Exercises –Case Studies –Problem Solving –Role-Play	Yes	Yes
Public Notification	State and Regional Water Supply Officers	2 Days	2–Instructor's Manual Participant's Handbook	Overhead Transparencies	4	Yes–Pre-Test Only	Yes	Yes Checklist Provided	Yes	–Lecture –Group Discussion –Performance Application –Self Study –Case Studies	No	Yes
Water System Operators Seminar	Water System Operators	2 Days	2–Instructor's Guide Student Handbook	3 Slide/Tape Presentations	9	Yes–for 4 Only	Yes	Yes–Checklist Provided	Yes–Measurable Outcomes	–Lecture/Discussion –Demonstration –Workshops –Problem-Solving	Each Unit has Selected References	No

NTOTC

National Training
and
Operational Technology Center

NTOTC SERVICES

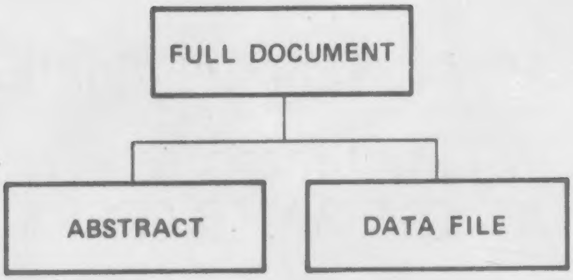
- PROVIDES TRAINING
- DEVELOPS TRAINING COURSES AND MATERIALS
- MAINTAINS WATER/WASTEWATER DOCUMENT STORAGE AND RETRIEVAL SYSTEM
- MAINTAINS LENDING LIBRARY OF INSTRUCTIONAL MATERIALS

IRIS

Water Quality

Instructional Resources Information System

Overhead 3-10



FULL DOCUMENT

ABSTRACT

DATA FILE

FULL COLLECTION OF
IRIS ABSTRACTS AVAILABLE:

- ON MICROFICHE-
  ERIC/SMEAC, AT NOMINAL CHARGE
- AS A BOUND DOCUMENT-
  ERIC/SMEAC, ESTIMATED COST $15
- COMPUTER TAPE-
  ERIC/SMEAC, COST NOT
  YET DETERMINED

ERIC/SMEAC

Educational Resources Information Center/
Science, Mathematics and Environmental
Education Clearinghouse.

Address: 1200 Chambers Road, Room 310
Columbus, Ohio 43212

Phone: (614) 422-6717

Overhead 3-13

SEARCH OF IRIS FILE WITH PRINTED OUTPUT:

- ERIC/SMEAC-
  FEE CHARGED FOR COMPUTER TIME
- USER LOCATION

IRIS

ABSTRACT CONTAINS THE FOLLOWING INFORMATION:

- TITLE
- PUBLICATION DATE
- AUTHOR(S)
- NUMBER OF PAGES
- INSTITUTION WHERE PREPARED
- SPONSORING AGENCY
- AVAILABLE SOURCE
- DESCRIPTOR WORDS
- IDENTIFIER WORDS
- DESCRIPTIVE SUMMARY

DESCRIPTIVE SUMMARY OF INSTRUCTIONAL DOCUMENTS CONTAINS:

- SUBJECT AREA
- TARGET POPULATION
- GRADE LEVEL
- SPECIFIC OBJECTIVES
- MAJOR TOPICS
- INSTRUCTIONAL METHODS
- SUPPLEMENTARY ACTIVITIES

IRIS ABSTRACT

EW 736120 ED 107998

PUBLICATION DATE: [75]

TITLE: An Analysis of the Waste Water Treatment Maintenance Mechanic Occupation.

AUTHOR: Clark, Anthony B.; And Others

NO. OF PAGES: 101 pages

INSTITUTION NAME: Ohio State Dept. of Education, Columbus. Div. of Vocational Education; Ohio State Univ., Columbus. Trade and Industrial Education Instructional Materials Lab.

SPONSORING AGENCY NAME: Office of Education (DHEW), Washington, D.C.

AVAILABLE FROM: EDRS Price MF-$0.76 HC-$5.70 PLUS POSTAGE

DESCRIPTOR: Communication Skills; *Environmental
Technicians: *Job Analysis; Knowledge Level; *Occupational
Information: Safety; Sanitation; Skill Analysis; Skill
Development: *Task Analysis; Task Performance; Work Attitudes

IDENTIFIER: *Waste Water Treatment Mechanics

The general purpose of the occupational analysis is to provide workable, basic information dealing with the many and varied duties performed in the waste water treatment mechanics occupation. The document opens with a brief introduction followed by a job description. The bulk of the document is presented in table form. Twelve duties are broken down into a number of tasks and for each task a two-page table is presented, showing on the first page: tools, equipment, materials, objects acted upon; performance knowledge (related also to decisions, cues and errors); safety-hazard; and on the second page: science; math--number systems; and communications (performance modes, examples, and skills and concepts). The duties include performance of: screenings and comminuting; grit removal; pumping; flow measurement; pretreatment by chemical addition; coagulation and flocculation; sedimentation; sludge wasting and digestion; biological decomposition via activated sludge, trickling filters, and oxidation lagoons; and chlorination. The document concludes with three appendixes covering work attitudes and desirable personal characteristics, a list of standard tools, and 40 pages of items used in wastewater treatment. (BP)

FULL DOCUMENTS THAT HAVE NO COPYRIGHT RESTRICTIONS, MAY BE OBTAINED FROM:

- ERIC LOCATIONS – TYPICALLY COLLEGE LIBRARIES
- ERIC/SMEAC

  ON MICROFICHE – NOMINAL CHARGE

  PHOTOCOPY – $1.00 PER TITLE PLUS $.03/PAGE (NO AV)
- IRC

  PRINTED COPY WITH AV's – LENDING LIBRARY, NO CHARGE

  AV's ONLY – VIDEOTAPES, DUPLICATED FREE WITH BLANK TAPE.

  SLIDE PROGRAMS, DUPLICATED FOR A FEE.
- SOURCE REFERENCED IN THE IRIS ABSTRACT.

IRC

Instructional Resource Center

COMMUNITY RESOURCES

- WATER PLANTS
- VOCATIONAL/TECHNICAL SCHOOL
- LIBRARIES
- TRAINEES AS INSTRUCTORS
- AREA ENVIRONMENTAL TRAINING CENTERS

LESSON TITLE:

Lesson 4. Selecting Instructional Methods

PURPOSE:

1. To explain the criteria for optimal sequencing of criterion objectives.
2. To review: 1) the basic elements of any learning situation, and 2) common instructional methods; including definitions, applications and limitations of each.

TRAINING OBJECTIVE

GIVEN:

1. A list of sample criterion objectives
2. Examples of training situations.
3. Examples of units of instruction.
4. The training objectives prepared in Lesson 2.

ACTION:

1. Participants will arrange objectives in proper sequence.
2. Participants will prescribe correct instructional methods to facilitate learning.

STANDARD:

1. Objectives will be sequenced to optimize learning.
2. Methods chosen will be appropriate for the objectives to be achieved and responsive to situational constraints.

INSTRUCTIONAL TECHNIQUES:

1. Lecture/Overheads
2. Group discussion
3. Performance/Application

PARTICIPANT MATERIAL:

Participant's Handbook

INSTRUCTIONAL MATERIAL:

1. Overhead projector
2. Overhead transparencies
3. Chalkboard and chalk

REFERENCES:

TIME:

2 hours

ACTIVITIES:

1. Lecture/Overheads
2. Individual exercise/Review

INSTRUCTIONAL EVENTS

I. EARLY STAGE

1. Brief instructor lecture describing general principles of sequencing behavioral objectives to optimize learning.
2. Lecture describing the elements of learning and ways to manipulate them to optimize learning.

II. INTERMEDIATE STAGE

1. Application of sequencing principles to a limited number of objectives in an individual exercise.
2. Participants will apply principles of selecting instructional methods to hypothetical training situations.

III. FINAL STAGE

Training teams will:

1. Sequence their training objectives.
2. Select instructional methods for use for each of the objectives.

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes

I. Introduction.

- A. Background
  - 1. Explain why sequencing objectives is important.
    - a. Because learning takes place over a period of time, you must consider the sequence in which students go through course material materials.
    - b. Provides students with a logical order to follow in completing the activities necessary for knowledges and skill development.
    - c. Some knowledges and skills are prerequisites for others. Example: One must be able to add before one can multiply.

II. Development.

- A. Sequencing objectives.
  - 1. There is a logical development of knowledge and skills. Major considerations are:
    - a. Determine which skills and/or knowledges are prerequisites to performance. Example: ability to make metric conversions must precede the actual calculation of MCLs.
    - b. These become your enabling objectives, which must be achieved before criterion (or overall) objectives.
  - 2. Sequence objectives to reflect task performance.
    - a. Example 1. Task of getting dressed in morning: "Take shower" objective precedes "Put on shoes" objective.

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	b. Example 2. Task of training design: "Determine training requirements" objective precedes that of "write" objectives.	
	3. Other factors that may determine sequencing of objectives:	
	a. Need an objective that will gain student interest early in the lesson.	
	b. Need to give students an overview of the subject.	
	c. Need for student success early in the course.	
	4. General Guidelines for Sequencing Objectives.	Overhead 4-1
	a. Begin with objectives that teach common elements.	
	b. Assure that prerequisite skills and knowledge are covered early.	
	c. Arrange the enabling objectives in the same sequence as their performance on the job or task.	
	d. Group objectives into homogeneous blocks of instruction on the basis of the similarity of behaviors involved.	
	e. Consider "pace" of learning and motivational state of participant. Discuss with participants.	
	5. Briefly review "why" and "how" of sequencing objectives. Ask for question/comments before exercise.	
	6. Have participants turn to Exercise 4-1. Instruct them to read the directions and complete the exercise.	Exercise 4-1

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	Allow about 5 minutes. Go over the answers to the exercise. Upon completion of the review of the exercise, ask the class for questions and/or answers.	
	B. *Instructional Methods*.	
	1. Let's take a closer look at the methods and media that can be used to optimize learning. The terms methods and media are often used interchangeably, but they are not synonymous. The basic differences are:	
	a. *Method* is the procedure or process for attaining an objective.	
	b. *Media* are means by which the procedure or process is expressed.	
	Example: Air travel is a *method* of getting fron one place to another. Some of the means by which this method of travel is realized are jet plane, helicopter, balloon, or dirigible. These can be thought of as the *media* by which air travel is expressed.	
	c. The contrast between the concepts of method and media can be seen in Overhead 4-12.	Overhead 4-2
	d. The four instructional methods we will cover here are: 1) Lecture. 2) Demonstration. 3) Discussion. 4) Performance.	Overhead 4-3

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	e. Common questions asked about these instructional methods are:	Overhead 4-4
	1) How is it defined?	
	2) Where is it appropriate?	
	3) What are its limitations?	
	4) What are the guidelines for its use?	
	5) How can its effectiveness be evaluated?	
	f. We will answer each of these questions for the four methods to be discussed.	
	1) Lecture Method.	Overhead 4-5
	a) Definition.	
	b) Applications.	
	c) Limitations.	
	d) Guidelines.	
	e) Effectiveness Evaluation.	
	2) Demonstration Method.	Overhead 4-6
	a) Definition.	
	b) Applications.	
	c) Limitations.	
	d) Guidelines.	
	e) Effectiveness Evaluation.	
	3) Discussion Method.	Overhead 4-7
	a) Definition.	
	b) Applications.	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	c) Limitations.	
	d) Guidelines.	
	e) Effectiveness Evaluation.	
	4) Performance Method.	Overhead 4-8
	a) Definition.	
	b) Applications.	
	c) Limitations.	
	d) Guidelines.	
	e) Effectiveness Evaluation.	
	d. This course, for example, uses all four methods, in cyclical fashion. With each skill introduced, we begin with a brief Lecture, or group Discussion, then a Demonstration, or a practice exercise, and finally you are asked to apply learned principles to developing actual instruction, which is Performance.	
	10. Briefly review material covered in this section.	
	QUESTION: Is everyone clear on the distinctions between the four methods, and their uses?	
	11. Individual Exercise. All participants should turn to Exercise 4-2 in Participant's Handbook and answer the questions there. This will take no more than five minutes. When finished, we'll discuss.	Exercise 4-2

Answers for Exercise 4-1

1. DIRECTIONS: The following are behavioral objectives related to changing a tire. Sequence them as you would if you were preparing a lesson on changing a tire.

Sequence them by placing the Number "1" by the objective which should appear first; the Number "2" by the one which would appear second; etc. Be prepared to explain why you sequenced the objectives as you did.

(NOTE: For the sake of brevity only the performance part of the objective is listed.)

Student will be able to:

5 Demonstrate how to elevate the car for removal of the flat tire using a tire jack.

11 Close trunk.

7 Demonstrate removing the wheels.

1 Open the trunk and remove the spare and other necessary items.

3 Remove the hubcap with a screwdriver.

2 Block wheels with wood blocks from trunk.

9 Lower the car and remove the jack.

10 Place tools, blocks, and flat tire in trunk.

6 Remove the lug nuts.

8 Mount the spare tire.

4 Loosen lug nuts.

2. DIRECTIONS: Group the objectives below into the units in which they should be taught. NOTE: Some objectives may not group or sequence logically; find those that do.

1 A. Open and close intake valve.

2 B. Troubleshoot intake pumps.

3 C. Adjust flow of chlorine.

3 D. Perform chlorine residual test.

2 E. Troubleshoot distribution system pumps.

1 F. Open and close distribution system valves.

2* G. Write maintenance work orders. *possible

____ H. Backwash filter bed.

Answers for Exercise 4-2

DIRECTIONS: In each situation described below, check (✓) those methods which are most appropriate to produce effective learning.

1. To teach someone the basic provisions of the SDWA.

[✓ a. Lecture]
b. Discussion
c. Demonstration
d. Performance

2. To assure that water suppliers learn how to replace a pump seal.

a. Lecture
b. Discussion
[✓ c. Demonstration]
[✓ d. Performance]

3. Instructing a group of water suppliers in exploring possible techniques to use in generating an implementation plan to meet the requirements of the SDWA.

a. Lecture
[✓ b. Discussion]
c. Demonstration
d. Performance

4. Teaching a laboratory technician the steps necessary in the performance of a nitrate test.

a. Lecture
b. Discussion
[✓ c. Demonstration]
[✓ d. Performance]

Answers to Exercise 4-2
Page Two

5. To assure that water suppliers are aware of the public notification procedures required by the SDWA.

_____ a. Lecture

_____ b. Discussion

_____ c. Demonstration

__✓__ d. Performance

INSTRUCTIONAL MATERIALS

Lesson 4. Selecting Instructional Methods

RULES FOR SEQUENCING OBJECTIVES

1. BEGIN WITH OBJECTIVES CONTAINING COMMON ELEMENTS.

2. ASSURE THAT PREREQUISITE SKILLS AND KNOWLEDGES ARE COVERED EARLY.

3. ARRANGE THE CONTINGENT TASK OBJECTIVES IN THE SAME SEQUENCE AS THEIR PERFORMANCE ON THE JOB.

4. GROUP OBJECTIVES INTO HOMOGENEOUS BLOCKS OF INSTRUCTION ON THE BASIS OF THE SIMILARITY OF BEHAVIORS INVOLVED.

5. CONSIDER PACE OF LEARNING AND IMPLIED PARTICIPANT ACTIVITIES.

EXERCISE 4-1

1. DIRECTIONS: The following are behavioral objectives related to changing a tire. Sequence them as you would if you were preparing a lesson on changing a tire.

Sequence them by placing the Number "1" by the objective which should appear first; the Number "2" by the one which would appear second; etc. Be prepared to explain why you sequenced the objectives as you did.

(NOTE: For the sake of brevity only the performance part of the objective is listed.)

Student will be able to:

_____ Demonstrate how to elevate the car for removal of the flat tire using a tire jack.

_____ Close trunk.

_____ Demonstrate removing the wheels.

_____ Open the trunk and remove the spare and other necessary items.

_____ Remove the hubcap with a screwdriver.

_____ Block wheels with wood blocks from trunk.

_____ Lower the car and remove the jack.

_____ Place tools, blocks, and flat tire in trunk.

_____ Remove the lug nuts.

_____ Mount the spare tire.

_____ Loosen lug nuts.

2. DIRECTIONS: Group the objectives below into the units in which they should be taught. Some objectives may not group or sequence logically; find those that do.

_____ A. Open and close intake valve.

_____ B. Troubleshoot intake pumps.

_____ C. Adjust flow of chlorine.

_____ D. Perform chlorine residual test.

_____ E. Troubleshoot distribution system pumps.

_____ F. Open and close distribution system valves.

_____ G. Write maintenance work orders.

_____ H. Backwash filter bed.

SOME BASIC DIFFERENCES BETWEEN METHODS AND MEDIA

METHODS	MEDIA
A procedure or process for attaining an objective. Same method may be expressed by several different media. Examples: The demonstration method may be conveyed on videotape, film, or audio tape. Programmed self-instructional method may be conveyed by various media, ranging from motion pictures to textbooks.	A channel of communication. ● Includes hardware, such as projectors, screens, tape recorders, etc. ● Includes software, such as films, tapes, computer programs. Same medium may be used to convey several methods. Example: A single motion picture may present various methods, such as a demonstration, a lecture or programmed self-instructional material.

INSTRUCTIONAL METHODS

- Lecture
- Demonstration
- Discussion
- Performance

COMMON QUESTIONS REGARDING INSTRUCTIONAL METHODS

- What Is It ?
- Where Is It Appropriate ?
- What Are Its Limitations ?
- What Are The Guidelines For Its Use ?
- How Can Its Effectiveness Be Evaluated ?

LECTURE METHOD

DEFINITION: A discourse given before a class or an audience for instructional purposes.

What are the Guidelines for Use?

- Prepare an outline or plan in advance.
- Organize the material into meaningful topics to promote understanding.
- Use visual aids to express abstract concepts or to show relationships.
- Allow time for a question and answer period to clarify points of confusion.

How can its Effectiveness be Evaluated?

- Direct questioning.
- Check tests.
- Assume from performance or demonstration.

Where is it Appropriate?

- Early stage of learning.
- Use in a formal course or in field-training condition.
- Use if time is short and many ideas must be presented.
- Use if number of instructors is limited and an instructor is responsible for a large number of students.
- Use with all types of courses.

What are its Limitations?

- Limits student participation. The lecture can become a "telling session" for the instructor.
- Checking student learning prior to testing is difficult.
- Student attention and interest may wander.

DEMONSTRATION METHOD

DEFINITION: An accurate portrayal of the precise actions necessary to perform skills or processes.

Where is it Appropriate?

- Use with on-the-job course, a formal course or field-training condition.
- Most useful in teaching motor skills, simple manual skills or processes, and foreign languages or other verbal chains.
- To set the standard of performance.
- To focus attention upon basic procedures.
- To provide overviews or set goals of instruction.

What are its Limitations?

- The demonstrator must be a skilled performer who is able to verbally explain each step being demonstrated. This may require many hours of practice.
- Since the student does not perform DURING a demonstration, it is difficult to evaluate the student's learning.

What are the Guidelines for Use?

- Have an expert perform the demonstration using actual equipment or apparatus the student will use on the job.
- Simultaneously provide a simple explanation of the ongoing procedure as it is being performed. Tell the "why" as well as "what" is being performed. Point out the critical aspects of the procedure.
- Provide repetition of complex operations.
- Immediately follow by supervised practice. If immediate practice is not feasible, ask student to verbally describe the performance or process.

How can its Effectiveness be Evaluated?

- Direct questioning
- Performance
- Check test

DISCUSSION METHOD

DEFINITION: Interaction between students and/or an instructor in order to analyze, explore, and/or debate an issue, topic, or problem.

Where is it Appropriate?

- Intermediate and final stages of learning.
- Use in formal course or field-training conditions.
- Use as an extension of existing knowledge or to clarify and amplify familiar material.
- Use when students must learn to identify and solve problems, and to frame their own decisions.
- Use when students need to be exposed to a variety of approaches, interpretations, and personalities.
- Use when teamwork is needed.

What are its Limitations?

- Time-consuming and limited by class size.
- Requires that participants have sufficient background so that they can talk about subject.
- Avoid using group discussions in early stages of learning when new material is being introduced, since students are new and inexperienced in the topic area.

What are the Guidelines for Use?

- Know the subject matter to be discussed.
- Verbally outline the specific problem or issue or provide a case study of the situation to be read prior to the discussion.
- Call upon individuals to clarify, analyze, and summarize.
- Guide the discussion; do not lecture!
- Be patient with group's slow progress to understanding.
- Be alert to group's tendency to wander.
- Use the Socratic approach.
- Make sure all students participate.

How can its Effectiveness be Evaluated?

- Direct observation.
- Check test.

PERFORMANCE METHOD

DEFINITION: Student practices, performs, and applies, under controlled conditions and close supervision, the skills or knowledges which have been previously explained and demonstrated.

Where is it Appropriate?

- Intermediate and final stages of learning.
- Use in on-the-job courses, formal course, and field-training conditions.
- To permit the student to apply learning to actual situations.
- To allow practice with job-similar conditions, under supervision and guidance.
- For verbal learning, problem solving or rule using, performance may be recitation, a written report, cast in a case study, or take the form of role-playing exercises.

What are its Limitations?

- It is time-consuming because students must be given the opportunity to practice until they reach proficiency.
- May require special facilities and equipment which may be expensive and difficult to obtain. Once obtained, equipment must be constantly maintained.
- Usually requires a higher student/instructor ratio than other methods of instruction.
- Role-playing may be discomforting for some students.

What are the Guidelines for Use?

- Plan student skill development from the simple to the complex.
- Provide explicit instructions for the student to follow when he is practicing.
- Provide safety precautions for the protection of the student and equipment.
- Set up realistic work problems, degree of realism may vary with stage of learning.
- Skill in group dynamics required to manage role-playing exercises.

How can its Effectiveness be Evaluated?

- Group critique.
- Direct observation.
- Evaluate written products.

EXERCISE 4-2

DIRECTIONS: In each situation described below, check (✓) those methods which are most appropriate to produce effective learning.

1. To teach someone the basic provisions of the SDWA.

   _____ a. Lecture

   _____ b. Discussion

   _____ c. Demonstration

   _____ d. Performance

2. To assure that water suppliers learn how to replace a pump seal.

   _____ a. Lecture

   _____ b. Discussion

   _____ c. Demonstration

   _____ d. Performance

3. Instructing a group of water suppliers in exploring possible techniques to use in generating an implementation plan to meet the requirements of the SDWA.

   _____ a. Lecture

   _____ b. Discussion

   _____ c. Demonstration

   _____ d. Performance

4. Teaching a laboratory technician the steps necessary in the performance of a nitrate test.

   _____ a. Lecture

   _____ b. Discussion

   _____ c. Demonstration

   _____ d. Performance

5. To assure that water suppliers are aware of the public notification procedures required by the SDWA.

    _____ a. Lecture

    _____ b. Discussion

    _____ c. Demonstration

    _____ d. Performance

LESSON TITLE:

Lesson 5. Selecting Instructional Media

PURPOSE:

To provide participants with definitions of and the criteria for the use of various types of media.

TRAINING OBJECTIVE

GIVEN:

1. A list of sample criterion objectives.
2. Examples of training situations.
3. Examples of units of instructions.
4. Training objectives prepared in Lesson 2.

ACTION:

1. Participants will select media to be used in specific applications.
2. Participants will specify what media is indicated.

STANDARD:

1. Media chosen will be appropriate to the objective and responsive to situational constraints.
2. Will meet all of the standards set in the lesson.

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INSTRUCTIONAL TECHNIQUES:

1. Lecture/Overheads
2. Group discussion
3. Performance/Application

PARTICIPANT MATERIAL:

Participant's Handbook

INSTRUCTIONAL MATERIAL:

1. Overhead projector
2. Overhead transparencies
3. Chalkboard and chalk

REFERENCES:

TIME:

2 hours

ACTIVITIES:

1. Lecture/Overheads
2. Individual exercise/Review

INSTRUCTIONAL EVENTS

I. EARLY STAGE

1. Lecture on general principles for choosing instructional media to optimize learning will be described.
2. Lecture with overheads presenting definitions of and criteria for the use of various types of media.

II. INTERMEDIATE STAGE

Participants will perform an individual exercise in which they will have to choose the best medium for various instructional situations.

III. FINAL STAGE

Training teams will:

Specify media for use for each of the objectives.

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	I. Introduction.	
	A. Selecting Instructional Media.	
	1. You have learned about how learning takes place, and the different methods of instruction appropriate to different types and stages of learning. It is not easy for the instructor alone to always be stimulating and motivating. The instructor can help facilitate student learning by using the various types of media available.	
	2. What are media?	
	a. An instructional medium is a channel of communication. Media include hardware such as projectors and tape recorders, as well as software such as films and tapes.	Overhead 5-1
	b. Instructional media, whatever the form, serve only one purpose--they are vehicles for transmission of skills and knowledges.	
	3. Why use media?	
	a. Common instructor comments:	
	1) "Slide/tape presentations are boring. They put the students and me to sleep."	
	2) "Films are too much trouble. Those projectors never work right. They are a waste of time since I already covered the material in the lecture."	
	3) Other examples.	
	b. Explain why instructors should use media.	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	1) Effectiveness of teaching can be increased by appealing to more than one sense at a time.	
	2) We retain (learn well enough to use later) approximately:	
	a) 10% of what we READ.	Overhead 5-2
	b) 20% of what we HEAR.	
	c) 30% of what we SEE.	
	3) We remember approximately 50% of what we both SEE and HEAR.	
	4) Some things cannot be understood clearly unless they are SEEN. (Examples to be discussed later in this section.)	
	5) We retain approximately 70% of what we SAY.	
	6) We retain approximately 90% of what we DO and SAY.	
	4. What are the types of media available?	
	a. The five types of media involve the student to varying degrees on an "active/passive continuum. Handout 5-1.	Handout 5-1
	1) Point out continuum on overhead.	
	2) Explain what is meant by "active" and "passive."	
	a) active--total active involvement due to the great interaction between students and medium.	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	b) passive--student merely hears and /or observes the message.	
	b. Read names and definitions of five types, as found on Handout 5-1.	
	c. Examples of five types and subcategories.	Overhead 5-3
	1) Indicate that tutorial media will seldom be used in training water plant operators.	
	2) Will be primarily concerned with.	
	a) Print media.	
	b) Visual aids.	
	c) Transient media.	
	5. More detail on each type of media and subcategories is contained in Handout 5-2. Can use these materials as job aids later.	Handout 5-2 (Job Aid #1)
	a. Assess instructional conditions to determine the need for media.	
	1) Ideally, trainees should acquire new skills under conditions and with equipment which are identical to those they will encounter on lthe job. The use of actual job conditions for training, however, is not always feasible.	
	2) Whenever the use of actual conditions isn't feasible, you will develop substitute situations. For example, you might use a film to demonstrate a procedure, use a	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	series of photographs or drawings to show the steps in assembling a piece of equipment. These substitutes which bridge the gap between training and performance are called media.	
	3) Convey abstract messages.	
	b. You should use media to provide substitute conditions if you have a serious problem with any of these considerations.	
	1) Costs.	
	2) Safety.	
	3) Resources.	
	6. Which medium to choose?	
	a. Now that you have determined the need for media, you must decide which most appropriate for accomplishing your objectives.	
	b. Refer students to Job Aid #1.	
	1) This Job Aid is designed to present the advantages and limitations of each of the media presented.	
	2) Students are to review the Job Aid. Allow about five minutes.	
	c. Other factors to consider when selecting a medium.	
	1) Class size. A large class requires a medium easily viewed by all.	Overhead 5-4
	2) Course time available. If you have 30 minutes course time, you would not want to use a 25-minute film.	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	3) Facilities available. Can the room be made dark enough to view slides?	
	4) Equipment available. Do you have access to an overhead projector and screen?	
	5) Funds available. Do you have the funds to purchase or rent the audiovisuals you need?	
	d. After completion, ask for questions or comments.	
	e. Individual Exercise.	
	1) Have students turn to Exercise 5-1 in Participant's Handbook.	Exercise 5-1
	2) Read instructions aloud.	
	3) Allow 5-7 minutes for completion of the exercise.	
	4) Discuss answers and provide feedback.	
	7. What are some sources of media?	
	a. It is important that you know what media and equipment are available to you in your area.	
	b. Review Job Aid #2.	Job Aid #2
	1) This is a partial list of national sources of instructional media for environmental training.	
	2) At your convenience, complete the remainder of the form with names and phone numbers of media sources in your area.	
	3) This can be used as a future reference document.	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	c. Ask for questions or comments.	
	8. Two important points to remember when selecting media are:	
	a. Determine the need for media.	Overhead 5-5
	b. Select the medium (media) to be used on the basis of the type and stage of learning.	
	III. Summary. Review briefly the major points concerning selection and use of instructional media.	
	IV. Group Exercise.	
	A. Direct participants to perform Exercise 5-2.	Exercise 5-2
	B. Have each group review the results of each member's contribution.	

Answers for Exercise 5-1

Select the best medium to use for each of the following instructional situations. Be prepared to discuss the reasons for your choice.

1. You are to teach a class of 30 operators how to troubleshoot a high speed pump.

   Which of the following media would be best suited to teaching this material? (Check one.)

   _____ 8" high cut-away scale model of a pump.

   _____ overheads of various types of pumps.

   _____ slides of pump parts.

   __✓__ wall chart diagram of a pump.

2. You are to teach a class of five people how to manually thread a 16mm projector.

   Which of the following media would be best suited to teaching this material? (Check one.)

   _____ 16mm film on how to thread a projector.

   __✓__ a 16mm projector with film.

   _____ a flip chart listing the steps involved in manually threading a 16mm projector.

   _____ a cut-away diagram of a 16mm projector.

3. You are to instruct a class of 50 operators how to re-route flow due to a failure in the distribution system. Course will involve problem-solving sessions where students will have to predict outcomes resulting from actions taken to re-route flow.

   Which of the following media would be best suited to teaching this material? (Check one.)

   _____ 16mm film on distribution systems.

   _____ a wall mounted, standard size blueprint of the distribution system.

   __✓__ overhead of a diagram of the distribution system with overlays for handmarking various flow patterns.

   _____ slides of various ways to re-route distribution flow.

EXERCISE 5-2

INSTRUCTIONS: Using the objectives you have written in Lesson 2, you are to identify the stages of learning involved, and select the method(s) and media you will use in your planned course.

PRODUCT: At the end of this exercise, you will be expected to have the data below, with topics sequenced in the order in which you expect to address them.

Objective Number	Stage of Learning	Method(s)	Media

TIME: You will be given approximately 30 minutes to complete this task.

Exercise 5-2
Page Two

Objective Number	Stage of Learning	Method(s)	Media

INSTRUCTIONAL MATERIALS

Lesson 5. Selecting Instructional Media

PURPOSES OF MEDIA

- Act as Channel of Communications
- Transmit Skills and Knowledges by Providing Orientation and Practice

ADULTS RETAIN:

- 10% OF WHAT THEY READ
- 20% OF WHAT THEY HEAR
- 30% OF WHAT THEY SEE
- 50% OF WHAT THEY SEE AND HEAR

FIVE CLASSES OF MEDIA WITHIN THE INSTRUCTIONAL SYSTEM

MOST STUDENT INVOLVEMENT ↔ LEAST STUDENT INVOLVEMENT

1 TUTORIAL MEDIA	2 ENVIRONMENTAL MEDIA	3 PRINT MEDIA	4 VISUAL AID MEDIA	5 TRANSIENT MEDIA
Present programmed instructional materials which bear the total burden of instruction	Create an artificial environment and realistically stimulate the learner	Present or display the entire VERBAL printed discourse with little or no instructor involvement	Support the learning experience by calling attention to or pointing out relevant properties to which the student should attend	Realistically present or display the entire visual, audio, or audiovisual instructional message with little or no instructor involvement

Handout 5-1

Overhead 5-3

EXAMPLES OF FIVE TYPES OF MEDIA AND SUBCATEGORIES

1. TUTORIAL MEDIA
    - Programmed Text
    - Learning Lab

2. ENVIRONMENTAL MEDIA AIDS
    - Simulator
    - Role Play

3. PRINT MEDIA
    - Textbook

4. VISUAL AIDS
    - Graphics:
        - Charts
        - Diagrams
        - Graphs
        - Illustrations/Drawings
        - Photographs
    - Exhibits:
        - Cutaways
        - Mock-Ups
    - Projected Still Images:
        - Opaque Projections
        - Overhead Transparencies
        - Slides

5. TRANSIENT MEDIA
    - Audio:
        - Radio
        - Tape Recorder
        - Record Player
        - Listening Lab
    - Visual:
        - Filmstrip (Silent)
    - Audiovisual:
        - Sound/Slide Projector
        - Television
        - Motion Picture

JOB AID NO. 1

Summary of Characteristics of Educational Media Materials

MATERIAL	ADVANTAGES	LIMITATIONS
Photographic print series	1. Permit close-up detailed study at individual's own pacing. 2. Are useful as simple self-study materials and for display. 3. Require no equipment for use.	1. Not adaptable for large groups. 2. Require photographic skills, equipment, and darkroom for preparation.
Chalk Board	1. Standard equipment in most classrooms. 2. Large surface area – good visibility. 3. Changes made easily.	1. Advance preparation not always convenient nor desirable. 2. Stationary. 3. Content written on chalk board is temporary.
Flip Chart	1. Easily prepared in advance. 2. Portable. 3. Ideas generated by students can be recorded and saved for future reference. 4. Can be stored for reuse.	1. Surface area limited – may cause visibility problems. 2. Cannot easily make revisions or changes.
Slide series	1. Can be used to illustrate: (a) close-ups; (b) key steps in a process; (c) hazardous procedures. 2. Require only filming, with processing and mounting by film laboratory. 3. Result in colorful, realistic reproductions of original subjects. 4. Prepared with any 35mm camera for most uses. 5. Easily revised and up-dated. 6. Easily handled, stored, and rearranged for various uses. 7. Increased usefulness with tray storage and automatic projection. 8. Can be combined with taped narration for greater effectiveness. 9. May be adapted to group or to individual use.	1. If making your own slide series, it requires some skill in photography. 2. Can get out of sequence and be projected incorrectly if slides are handled individually. 3. Not as dynamic as films or television presentations.

MATERIAL	ADVANTAGES	LIMITATIONS
Filmstrips	1. Are compact, easily handled, and always in proper sequence. 2. Can be supplemented with captions or recordings. 3. Are inexpensive when quantity reproduction is required. 4. Are useful for group or individual study at projection rate controlled by instructor or user. 5. Useful in showing: (a) abstract concepts; (b) key steps in processes; (c) dangerous skills or operations. 6. Are projected with simple lightweight equipment.	1. Are in permanent sequence and cannot be rearranged or revised. 2. Cannot illustrate motion. 3. Are relatively difficult to prepare locally – require film-laboratory service to convert slides to filmstrip form. 4. Commercially-produced filmstrips may not always meet your lesson's objectives or the needs and interests of your students. 5. They are not as dynamic as films.
Recordings	1. Easy to prepare with regular tape recorders. 2. Can provide applications in most subject areas. 3. Equipment is compact, portable, easy to operate. 4. Flexible and adaptable as either individual elements of instruction or in combination with programmed materials. 5. Duplication easy and economical.	1. Have a tendency for overuse, as lecture or oral textbook reading. 2. Fixed rate of information flow.
Overhead transparencies	1. Can present information in systematic, developmental sequences. 2. Use simple-to-operate projector with presentation rate controlled by instructor. 3. Require only limited planning – materials can be prepared ahead of time. 4. Can be prepared by variety of simple, inexpensive methods. 5. Can be used in almost any classroom/laboratory. 6. Can be used in a normally lighted classroom. 7. Particularly useful with large groups. 8. Transparencies easily stored for reuse.	1. Can show motion only in a limited way. 2. Cannot project student's papers or pages from books. 3. Require special equipment, facilities, and skills for more advanced preparation methods (overlays).

MATERIAL	ADVANTAGES	LIMITATIONS
Motion Pictures	1. May consist of complete films or short film clips. 2. Are particularly useful in describing motion, showing relationships, or giving impact to topic. 3. 8mm film reduces cost for materials and services. 4. Are useful with groups of all sizes. 5. Sound is easily added to magnetic film. 6. May include special techniques for handling content. 7. Insure a consistency in presentation of material.	1. Projectors not always easily accessible. 2. Films are usually rented, which means you must order in advance, and allows no course flexibility. 3. Film projectors must be operated in a room which is almost totally dark. 4. Not well suited to individual instruction. 5. Students may view the film as "entertainment."
Television and display materials	1. Permit selecting the best audio-visual media to serve program needs. 2. Permit shifting from one medium to another during program. 3. Permit normally unavailable resources to be presented. 4. Playback capability of video recording permits analysis of on-the-spot action. 5. New-type display boards provide flexibility in displaying various kinds of objects and writing on surface.	1. Do not exist alone, but are part of total television production. 2. Must fit technical requirements of television. 3. At times require rapid preparation of materials. 4. Some display boards are expensive to make or purchase.
Multi-image/ multimedia	1. Combine presentation of slides with other media forms for presentations. 2. Use photographs, slides, filmstrips and recordings in combination for independent study. 3. Provide for more effective communications than a single medium.	1. Require additional equipment and careful coordination during planning, preparation and use.

Source: Adapted from: The Advanced Instructor Technology Course, College of Education, Drake University, Des Moines, Iowa. EPA Grant No. 900-256.

Handout 5-2
Page Three

OTHER FACTORS TO CONSIDER WHEN SELECTING A MEDIUM:

- CLASS SIZE
- COURSE TIME
- FACILITIES
- EQUIPMENT
- FUNDS

EXERCISE 5-1

Select the best medium to use for each of the following instructional situations. Be prepared to discuss the reasons for your choice.

1. You are to teach a class of 30 operators how to troubleshoot a high speed pump.

   Which of the following media would be best suited to teaching this material? (Check one.)

   _____ 8" high cut-away scale model of a pump.

   _____ overheads of various types of pumps.

   _____ slides of pump parts.

   _____ wall chart diagram of a pump.

2. You are to teach a class of five people how to manually thread a 16mm projector.

   Which of the following media would be best suited to teaching this material? (Check one.)

   _____ 16mm film on how to thread a projector.

   _____ a 16mm projector with film.

   _____ a flip chart listing the steps involved in manually threading a 16mm projector.

   _____ a cut-away diagram of a 16mm projector.

3. You are to instruct a class of 50 operators how to re-route flow due to a failure in the distribution system. Course will involve problem-solving sessions where students will have to predict outcomes resulting from actions taken to re-route flow.

   Which of the following media would be best suited to teaching this material? (Check one.)

   _____ 16mm film on distribution systems.

   _____ a wall mounted, standard size blueprint of the distribution system.

   _____ overhead of a diagram of the distribution system with overlays for handmarking various flow patterns.

   _____ slides of various ways to re-route distribution flow.

JOB AID NO. 2

MEDIA SOURCES

The following is a Job Aid designed to provide you with sources of media (both printed and audio/visual) at national and local levels. We have provided you with information on four national sources. However, only you can provide the names of media sources in your area. Some examples of media sources in your area are:

- Regional EPA Office
- University or Community College Libraries
- State Department of Vocational Education
- Colleagues or Supervisors

You will be able to think of others.

Complete this Job Aid by filling in the appropriate information for the media source(s) of your choice. This form can be used as a desk reference, or be copied and distributed to your local water operator instructors.

Job Aid #2
Page Two

MEDIA SOURCES

SOURCE	MATERIALS AVAILABLE	COST	
		Purchase	Borrow/ Rent
Name: National Training & Operational Technology Center (NTOTC) Address: Office of Water Program Operations U. S. Environmental Protection Agency Cincinnati, Ohio 45268 Phone No.: (513) 684-7501 Person to Contact:	Slide/Tape Instructional Units Videocassette Instructional Units Films Printed Course Units (Catalogue Available)	Yes Printed	Yes A/Vs
Name: National Technical Information Service Address: U. S. Department of Commerce 5285 Port Royal Road Springfield, VA 22151 Phone No.: (703) 557-4650 (703) 321-8948* Person to Contact:	Printed Materials Computer Tapes (Catalogue Available)	Yes	
Name: American Association for Vocational Instructional Materials (AAVIM) Address: 120 Engineering Center Athens, Georgia 30602 Phone No.: (404) 542-2586 Person to Contact:	Series of 100 Performance-Based Teacher Education Learning Manuals Manuals available individually or grouped as modules.	Yes	
Name: American Water Works Association (AWWA) Address: 6666 W. Quincy Avenue Denver, Colorado 80235 Phone No.: Person to Contact:	Course Packages (Printed Material and Audio Visuals)	Yes	
Name: Address: Phone No.: Person to Contact:			
Name: Address: Phone No.: Person to Contact:			
Name: Address: Phone No.: Person to Contact:			

*Rush Service – $10 Extra

MEDIA SOURCES

SOURCE	MATERIALS AVAILABLE	COST	
		Purchase	Borrow/ Rent
Name: Address: Phone No.: Person to Contact:			
Name: Address: Phone No.: Person to Contact:			
Name: Address: Phone No.: Person to Contact:			
Name: Address: Phone No.: Person to Contact:			
Name: Address: Phone No.: Person to Contact:			
Name: Address: Phone No.: Person to Contact:			
Name: Address: Phone No.: Person to Contact:			

POINTS TO REMEMBER WHEN SELECTING MEDIA ARE:

- DETERMINE NEED FOR MEDIA.
- SELECT MEDIUM (MEDIA) THAT BEST MEETS COURSE OBJECTIVES.

EXERCISE 5-2

INSTRUCTIONS: Using the objectives you have written in Lesson 2, you are to identify the stages of learning involved, and select the method(s) and media you will use in your planned course.

PRODUCT: At the end of this exercise, you will be expected to have the data below, with topics sequenced in the order in which you expect to address them.

Objective Number	Stage of Learning	Method(s)	Media

TIME: You will be given approximately 30 minutes to complete this task.

Exercise 5-2
Page Two

Objective Number	Stage of Learning	Method(s)	Media

LESSON TITLE:

Lesson 6. Preparing a Lesson Plan

PURPOSE:

1. To provide guidelines for adapting predeveloped materials for training use.
2. To familiarize participants with the necessary elements of a sound instructional lesson plan to provide the skills and knowledges necessary to prepare actual lesson plans.

TRAINING OBJECTIVE

GIVEN:

1. Instructor-asked questions.
2. Sample lesson plan segments.

ACTION:

1. Be able to list aspects of predeveloped materials to be considered before including them in the design of new materials.
2. Critique samples of a lesson plan and identify their weaknesses.

STANDARD:

1. List at least four considerations including the two most critical considerations.
2. Identify 90% of the sample lesson plans weaknesses.

INSTRUCTIONAL TECHNIQUES:

1. Lecture guided discussion
2. Group exercise
3. Review

PARTICIPANT MATERIAL:

1. Participant's Handbook
2. Available instructional resources

INSTRUCTIONAL MATERIAL:

1. Flip chart/Blackboard
2. Overhead transparencies/projector

REFERENCES:

TIME:

2 hours

ACTIVITIES:

1. Guided discussion to establish the criteria for a good lesson plan.
2. Review lesson plan forms quickly.
3. Group exercise--critique sample lesson plan segments/Review

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INSTRUCTIONAL EVENTS

I. EARLY STAGE

1. Lecture/Discussion of aspects of predeveloped training materials to be considered when reviewing instructional resources.
2. Lecture/Discussion reviewing the format and content of an Instructor Lesson Plan.

II. INTERMEDIATE STAGE

Critiques sample segments of an Instructor Lesson Plan to determine weaknesses.

III. FINAL STAGE

Prepares Instructor Lesson Plans.

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	I. Introduction. This section will: A. Discuss the actual preparation of materials to support training design. B. Provide participants with the skills and knowledge involved in preparing a complete lesson plan. II. Development. A. Review of materials may result in changes being made to your original training design to accommodate the use of available resources. 1. Available resources may include pre-developed curriculum packages, audio-visual presentations (films, video tapes), slides, texts, etc. 2. Question: What considerations should be made before adopting the use of any pre-developed materials? Lead discussion and record suggestions on flip chart. Discussion should yield consideration of: a. Appropriateness to accomplishing the criterion objectives. b. Appropriateness of material with respect to optimizing learning. c. Cost considerations. d. Copyright considerations. e. Availability. f. Appropriateness to the audience/facility and course/class time. B. Once you have established which resources are available resources, you are ready to begin to write content to accomplish the training objectives. The focus of materials develop- ment is upon the Instructor's Lesson Plan (ILP).	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	C. Lesson Plan Format. These pages specify exactly what will take place in the actual training. Review entries of suggested Lesson Plan Format found in Overhead 6-1.	Overhead 6-1
	1. Emphasize that these are suggested formats, and participants are free to choose any other format.	
	2. Take particular note of the three parts of the training objective that are included in the first page.	
	3. Review entries on flip side of first ILP page. See Overhead 6-2.	Overhead 6-2
	a. May want to give rough time-estimate at this point.	
	b. Instructional material includes equipment requirements.	
	4. Review entries on second ILP page. See Overhead 6-3.	Overhead 6-3
	a. Purpose is to increase awareness of the stages of learning and instructional steps which may support learning.	
	b. Review the instructional methods which best support each stage.	
	5. Review entries on flip side of second ILP page on Overhead 6-4.	Overhead 6-4
	a. "Support Materials" column indicates where materials are actually used.	
	b. This column also includes any references to pages in participant materials.	
	D. Lesson Plan Content.	
	The actual text that is written for the "Instructional Events" column of the ILP is entirely up to the	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	instructor. Many people are completely confident with the outline form, such as:	
	[Go to the chalkboard and list:] 1. Lecture. 2. Demonstration. 3. Discussion. 4. Performance.	Chalkboard and Chalk.
	Others prefer a more detailed outline, wherein they might list definitions, advantages and disadvantages, applications of the method, etc. No firm rules can be made, because of individual differences. There are, however, a few guidelines that can be used. These are shown on Overhead 6-5. 1. Introduction. 2. Body of Unit. 3. Summary. [Ask for some examples from the group of how they might structure their lesson plans.]	Overhead 6-5
	E. Exercise 6-1. Instruct participants to review the materials and instructions for Exercise 6-1.	Exercise 6-1
	1. Have each group put their responses on their team's flip chart.	Flip chart.
	2. Review group answers.	
	III. Summary.	
	A. Remember that the level of detail used in an ILP depends entirely upon your instructional "style," and level of confidence in the material. Where an instructor knows it well, he/she will be	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	comfortable with an outline form. When the material is new, or the person writing the ILP will not actually deliver the course, the level of detail should be much greater. 1. In such instances the developer should list specific quetions to be asked, specific examples to be used, specific steps to be included in a demonstration, etc. 2. Being specific will help reduce "noise" in the training and will increase the amount of "on target" training. B. A detailed lesson plan helps you get straight on exactly what is being taught and provides you the opportunity to determine whether the lesson objectives are actually accomplished.	

ANSWER SHEET FOR EXERCISE 6-1

Note: All additions and corrections that should have been made the portion of the Lesson Plan are circled on these answer sheets.

DETAILED LESSON PLAN

Time	Instructional Events	Support Materials/Notes
	No Introduction or Transition Statement.	
1:00	I. Public Notification Requirements for Community or Non-Community Water Systems.	
	A. Point out that community water systems are defined as those public water systems which have 15 connections or serve 25 persons.	
	B. Point out that community water systems will be doing much more in the way of public notification than will non-community water systems.	
	QUESTION: Why will this be true?	References to pages in Participant's Handbook.
	II. Characteristics of Good Public Notification.	
	A. Review the basic elements of public notification, using Overhead III-1.	Overhead III-1.
	B. Review characteristics of good public notification.	
	1. Attention-getting qualities (for reader or listener).	Overhead III-2.
	EXAMPLES: For reader, use color, large type. For listener, use authoritative style.	
	2. Clear, concise, non-technical writing style.	Overhead III-3.

Answer Sheet for Exercise 6-1
Page Two

DETAILED LESSON PLAN

Time	Instructional Events	Support Materials/Notes
	3. Appropriateness to the ethnic, cultural, religious, and educational background of the consumer.	Overhead III-4.
	4. Completeness of the information offered.	
	5. Presentation which does not unnecessarily arouse anxiety (for reader or listener).	Overhead III-5.
	QUESTION: What kinds of words arouse anxiety?	
	C. Demonstrate by writing a brief notice in the suggested format and structure.	
	Demonstration steps should be specified.	
	III. Summarize the key points of this lesson.	
	Key points should be specified.	

Answer Sheet for Exercise 6-1
Page Three

LESSON TITLE: III. Notification for Community and Non-Community Water System

PURPOSE:

To provide the participants an opportunity to design and evaluate public notifications for specific violations in community and non-community water systems.

TRAINING OBJECTIVE

GIVEN:

Detailed description of violations and the affected consumers, as well ad the criteria which the notifications must meet.

ACTION:

The participant will prepare one of the following types of notifications: (a) notification to be sent with water bill, (b) direct mail notification (other than with water bill), (c) notice for a newspaper, and (d) press release for broadcast media.

The participant will evaluate the effectiveness of a notification prepared by another participant, but of a different type than developed by the participant.

STANDARD: The finished notification(s) generated by the participants must meet the following criteria:

a. Attracts the attention of the listener or reader.
b. Is encoded in a non-technical language appropriate to the ethnic, cultural, religious and/or educational background of the consumer.
c. Conveys all relevant information regarding: who, what, the authority, the regulations involved, the health significance, action being taken, and the action the consumer should take.
d. Is presented in a manner which does not unnecessarily arouse the anxiety of the reader or listener.
e. Is formatted and structured in a manner appropriate to the medium involved and designed to facilitate the perception by the consumer of critical elements of the message.
f. Meets requirements set forth in the law.

Answer Sheet for Exercise 6-1
Page Four

INSTRUCTIONAL TECHNIQUES:

1) Self-study
2) Lecture/overheads
[✓ 3) Group discussion]
[✓ 4) Performance/application]

PARTICIPANT MATERIAL:

1) Pens and paper
2) Participant's Handbook

INSTRUCTIONAL MATERIAL:

1) Overhead transparencies
2) Sample notification(s)
[✓ 3) Overhead projection]

REFERENCES:

1) Sample notification(s)
2) Readings in Participant's Handbook
3) Criteria

TIME:

Day 1 - 4 hours

1) 1:00 - 1:45
2) 1:45 - 2:15
3) 2:15 - 3:00
4) 3:00 - 3:15
5) 3:15 - 4:15
6) 4:15 - 4:30
7) 4:30 - 5:00

ACTIVITIES:

1) Lecture/overheads on requirements for notification
2) Discussion of sample case
3) Design of notification
4) Break
5) Discussion
6) Lecture/discussion
7) Case study

Answer Sheet for Exercise 6-1
Page Five

INSTRUCTIONAL EVENTS

I. EARLY STAGE

The participant will have read material before coming to class which describes and discusses theory and practice regarding how to convey information that conforms to the criteria in the objective. The instructor will summarize and discuss the important characteristics of each type of notice and how they should be written and formatted.

II. INTERMEDIATE STAGE

Using a sample case, the instructor will present a notification for class discussion. Suggestions will be elicited from participants regarding format, language, etc., suitable to the consumer population being addressed in the sample case.

III. FINAL STAGE

Sample cases will be assigned to participants, and each participant will develop a notice for a given violation/exemption. Participants will read notices and critique and discuss them, using the established criteria. A sample of a non-community public notification case will be discussed as a group.

INSTRUCTIONAL MATERIALS

Lesson 6. Preparing a Lesson Plan

LESSON TITLE:
PURPOSE:

TRAINING OBJECTIVE
GIVEN:
ACTION:
STANDARD:

Overhead 6-2

INSTRUCTIONAL TECHNIQUES:

PARTICIPANT MATERIAL:

INSTRUCTIONAL MATERIAL:

REFERENCES:

TIME:

ACTIVITIES:

Overhead 6-3

INSTRUCTIONAL EVENTS

I. EARLY STAGE

II. INTERMEDIATE STAGE

III. FINAL STAGE

DETAILED LESSON PLAN

Time	Instructional Events	Support Materials/Notes

GUIDELINES FOR CONTENTS OF "INSTRUCTIONAL EVENTS" COLUMN

1. INTRODUCTION

Usually begins with a transition statement that leads from prior material into topic to be covered.

2. BODY OF UNIT

Contains outline of all major points to be made in lecture or discussion. If instructor will DEMONSTRATE, contains steps to be followed in demonstration, particular items to be noted, etc.

Also contained here will be specific statements to be made, such as directions, questions, or cautions.

3. SUMMARY

This final section restates the points made in the unit, repeats the conclusions reached in the group's discussions of each point, and clarifies any issues that were debated. Always closes with the request for any discussions or comments before going on.

EXERCISE 6-1

Instructions: You are asked to critique, as a group, the attached portion of a lesson plan for clarity and ease of use. You are to assume that this has been written for a knowledgeable instructor, familiar with the provisions of the SDWA.

Begin by reviewing the three unit design pages to detect omissions or errors. Then look at the Detailed Lesson Plan page and critique it for format and content.

Products: As the products of this exercise, you will be expected to review the lesson plan:

1. Note where items are missing on the first three pages.
2. Add a question and an example that could be used in the lesson plan.

You may write directly on your workbook pages.

Time: You and your group are expected to finish the above tasks within 15 minutes.

Exercise 6-1
Page Two

LESSON TITLE:
III. Notification for Community and Non-Community Water System

PURPOSE:

To provide the participants an opportunity to design and evaluate public notifications for specific violations in community and non-community water systems.

TRAINING OBJECTIVE

GIVEN:

ACTION:

The participant will prepare one of the following types of notifications: (a) notification to be sent with water bill, (b) direct mail notification (other than with water bill), (c) notice for a newspaper, and (d) press release for broadcast media.

The participant will evaluate the effectiveness of a notification prepared by another participant, but of a different type than developed by the participant.

STANDARD: The finished notification(s) generated by the participants must meet the following criteria:

a. Attracts the attention of the listener or reader.
b. Is encoded in a non-technical language appropriate to the ethnic, cultural, religious and/or educational background of the consumer.
c. Conveys all relevant information regarding: who, what, the authority, the regulations involved, the health significance, action being taken, and the action the consumer should take.
d. Is presented in a manner which does not unnecessarily arouse the anxiety of the reader or listener.
e. Is formatted and structured in a manner appropriate to the medium involved and designed to facilitate the perception by the consumer of critical elements of the message.

INSTRUCTIONAL TECHNIQUES:

1) Self-study
2) Lecture/overheads

PARTICIPANT MATERIAL:

1) Pens and paper
2) Participant's Handbook

INSTRUCTIONAL MATERIAL:

1) Overhead transparencies
2) Sample notification(s)

REFERENCES:

1) Sample notification(s)
2) Readings in Participant's Handbook
3) Criteria

TIME:

Day 1 - 4 hours

1) 1:00 - 1:45

2) 1:45 - 2:15
3) 2:15 - 3:00
4) 3:00 - 3:15
5) 3:15 - 4:15
6) 4:15 - 4:30
7) 4:30 - 5:00

ACTIVITIES:

1) Lecture/overheads on requirements for notification
2) Discussion of sample case
3) Design of notification
4) Break
5) Discussion
6) Lecture/discussion
7) Case study

INSTRUCTIONAL EVENTS

I. EARLY STAGE

The participant will have read material before coming to class which describes and discusses theory and practice regarding how to convey information that conforms to the criteria in the objective. The instructor will summarize and discuss the important characteristics of each type of notice and how they should be written and formatted.

II. INTERMEDIATE STAGE

Using a sample case, the instructor will present a notification for class discussion. Suggestions will be elicited from participants regarding format, language, etc., suitable to the consumer population being addressed in the sample case.

III. FINAL STAGE

Sample cases will be assigned to participants and each participant will develop a notice for a given violation/exemption. Participants will read notices and critique and discuss them, using the established criteria. A sample of a non-community public notification case will be discussed as a group.

DETAILED LESSON PLAN

Time	Instructional Events	Support Materials/Notes
1:00	I. Public Notification Requirements for Community or Non-Community Water Systems.	
	A. Point out that community water systems are defined as those public water systems which have 15 connections or serve 25 persons.	
	B. Point out that community water systems will be doing much more in the way of public notification than will non-community water systems.	
	II. Characteristics of Good Public Notification.	
	A. Review the basic elements of public notification, using Overhead III-1.	Overhead III-1.
	B. Review characteristics of good public notification.	
	1. Attention-getting qualities (for reader or listener).	Overhead III-2.
	2. Clear, concise, non-technical writing style.	Overhead III-3.
	3. Appropriateness to the ethnic, cultural, religious, and educational background of the consumer.	Overhead III-4.
	4. Completeness of the information offered.	Overhead III-5.
	5. Presentation which does not unnecessarily arouse anxiety (for reader or listerner).	
	C. Demonstrate by writing a brief notice in the suggested format and structure.	
	III. Summarize the key points of this lesson.	

LESSON TITLE:

Lesson 7. Preparing Simple Visual Aids

PURPOSE:

To provide participants with the skills and knowledges which underlie the preparation of audiovisual aids.

TRAINING OBJECTIVE

GIVEN:

Sample audiovisual aids

ACTION:

Identify those AV aids which meet and do not meet established criteria for "good" audiovisuals, and why.

STANDARD:

Correctly identify "good" and "poor" AVs, and be 90% correct in describing how to improve inadequate AVs.

INSTRUCTIONAL TECHNIQUES:

1. Self-instructional reading
2. Group exercise/discussion

PARTICIPANT MATERIAL:

INSTRUCTIONAL MATERIAL:

1. Self-instructional reading
2. Slides/projector
3. Overhead transparencies/projector
4. Flip chart

Note: Special preparation is required of instructor.

REFERENCES:

Kemp, Jerrold E. Planning and producing audiovisual materials (2nd ed.) Scranton, PA: Chandler Publishing Company, 1968.

TIME:

2 hours

ACTIVITIES:

1. Self-instructional reading
2. Group exercise--critique AVs
3. Summary

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INSTRUCTIONAL EVENTS

I. EARLY STAGE

Self-instructional reading on different types of media.

II. INTERMEDIATE STAGE

Group exercise on evaluating specific AVs

III. FINAL STAGE

Summary and critique of exercise products

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DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	I. Introduction.	
	A. Direct participants to Self-Instructional Reading #2.	Self-Instructional Reading #2
	1. Indicate to participants that there are questions throughout the reading, and that all answers are contained in the text. You will not review each question and answer.	
	2. Have participants read the assignment, allowing at least 15 minutes.	
	3. After completion of the reading, ask for questions or comments.	
	II. Development.	
	A. Ask group to turn to Exercise 7-1.	
	1. Review instructions on Exercise 7-1.	Exercise 7-1
	2. Have participants use the scales to evaluate media samples which you have prepared in advance according to the directions found in Exercise 7-1. Participants are to write their answers on the Media Evaluation Sheet.	Media Evaluation Sheets
	3. Discuss the results of the evaluations for each sample, and provide feedback.	
	III. Summary.	
	A. Three categories of media covered here were:	
	1. Self-prepared.	
	2. Obtained from an outside source.	
	3. Part of a pre-developed training program.	
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DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	B. Stress the importance of knowing: 1. The specifications for a finished product. 2. How to preview/review media.	

EXERCISE 7-1

Instructor's Guidelines

Preparation for Exercise

Certain steps must be taken by you, the instructor, to assure that the participants gain necessary information from Exercise 7-1. These steps are to be done within 7-10 days before the actual conduct, to assure that your materials are ready.

Your responsibilities are to provide at least one sample of each of the following:

1. Flip chart
2. Overhead transparency
3. 35mm slide

These samples you prepare must be deficient in some way(s), to give the participants an opportunity to evaluate them. If you choose, you can use more than one sample (perhaps a few good and a few poor) and reproduce the Media Evaluation Sheets. Before using them, however, each sample should be evaluated by you and at least one other experienced instructor, to assure that you know what ratings to expect from the participants.

In addition to preparing the samples, you will also be responsible for assuring that the necessary equipment (flip chart easel and projectors) are in the classroom and ready for use when you conduct the exercise.

Exercise Conduct

The steps to be followed in this exercise are:

1. Explain the instructions and be sure the participants understand how to use the Media Evaluation Sheet.
2. Display each sample, and allow participants sufficient time to enter their ratings on the sheets.
3. Review their responses at the end of the exercise, and discuss any/all disagreements.

EXERCISE 7-1

Media Evaluation Sheet

Please use the following scales to rate the specific dimensions of media samples provided by your instructor. Place a check (✓) on the scale to record your rating of the sample.

FLIP CHART

	Poor	Adequate	Good	Excellent
1. Legibility	____	____	____	____
2. Use of color	____	____	____	____
3. Letter size	____	____	____	____
4. Word spacing	____	____	____	____
5. Line spacing	____	____	____	____
6. Overall quality	____	____	____	____

OVERHEAD TRANSPARENCY

	Poor	Adequate	Good	Excellent
1. Legibility	____	____	____	____
2. Use of color	____	____	____	____
3. Letter size	____	____	____	____
4. Word spacing	____	____	____	____
5. Line spacing	____	____	____	____
6. Overall quality	____	____	____	____

SLIDE

	Poor	Adequate	Good	Excellent
1. Focus	____	____	____	____
2. Exposure (light or dark)	____	____	____	____
3. Visibility	____	____	____	____
4. Accuracy of representation	____	____	____	____
5. Overall quality	____	____	____	____

Answers for Self-Instructional Reading #2

As an instructor, you will encounter three categories of media: 1) those you prepare yourself, 2) those you obtain for a particular purpose from an outside source, and 3) those which are part of a pre-developed training program. This reading will discuss all three categories, but will focus on the first by presenting features and specifications of media you can prepare yourself.

Throughout this reading assignment are check questions based on content you have been reading. These questions are not tests of your ability, but simply tools designed to help you learn the material you are reading. No answer key is provided. All answers can be found in the text preceding the questions. If you have difficulty answering a question, look back over the material until you find the correct answer. It is important that you try to answer each question before you look back over the material.

Category 1

Media you can easily prepare yourself are:

- flip chart.
- graphic illustrations.
- overhead transparencies.
- slide series.

The basic feature of an effective flip chart is that it, and what is written on it, be visible to everyone in the classroom. Visibility involves using proper writing instruments and techniques.

You should use dark colored, wide-tipped felt markers on a flip chart. Do not use pencils, ballpoint pens, or felt tips designed for everyday use since they do not make heavy, wide lines which can be seen at a distance. Blue or black are the suggested colors to use. You may wish to use other colors to highlight or contrast ideas or drawings. Just make sure the color is visible to all. A way of checking color visibility is to write a word on the flip chart with each marker you intend to use. Walk to the back of the room, and if you can easily read each word, the colored marker is suitable. This is also a way of checking if your writing is legible.

How you write on a flip chart is very important. As stated above, you must write large enough to be seen from the back of the classroom. But writing is the wrong word to use, since you should always, PRINT.

When PRINTING on a flip chart:

- Use all capital letters for short titles and labels. For longer captions (five or more words) or subtitles, use lower-case letters with appropriate capitals since lower-case letters are more easily read.
- Put subject matter in outline form whenever possible.
- Limit the usage of prepositions (a, an, the, etc.) in titles and headings.
- Allow adequate space between words and lines. Too much or too little space makes reading difficult.

. . . .

Answer the following questions about flip charts.

1. Which of the following features is basic to effective utilization of a flip chart?

   __✓__ a. Visibility.

   _____ b. Using an outline format.

   _____ c. Having it prepared in advance.

2. An advantage of using a flip chart is that you can use any writing instrument which is convenient.

   _____ a. True.

   __✓__ b. False.

3. Which of the following is NOT an important factor to consider when preparing a flip chart?

_____ a. Always PRINT

_____ b. Use an outline format whenever possible.

_____ c. Allow adequate space between lines.

_____ d. Use a marker with yellow ink when describing to highlight a specific word.

_____ e. Use all capital letters at all times.

. . . .

Graphic Illustrations: Examples of graphic illustrations commonly used in the classroom are charts, graphs, diagrams, and blueprints.

When preparing graphic illustrations, you should be aware of basic design principles that can be applied in these and other media situations. These design principles include: simplicity, unity, emphasis, and balance.

Simplicity:

- Present only one idea at a time.
- Subdivide or redesign lengthy or complex information into a number of easy-to-read and easy-to-understand related materials.
- Drawings should be bold, simple, and contain only key details.

Unity:

- Achieved by: Overlapping elements.
  using pointing devices (arrows).
  visual tools (connecting lines, color coding similar items, using similar shapes, etc.).

Emphasis:

- The need to emphasize an element can be achieved by using size (generally larger) or different shape or color.

Balance:

- Arrange elements to create an equilibrium (do not draw everything in the upper left-hand corner).
- Keep side margins equal, with a somewhat greater area at the bottom than at the top.

When using "commercial" graphics, such as water plant blueprints or diagrams, be sure the fine lines of these graphics are visible to all the students. If they are, these graphics can be mounted on cardboard or poster board and displayed in front of the classroom. If they are not visible, you may wish to have them, or certain sections, enlarged. Another alternative would be to have the entire blueprint/diagram, or sections of them, reduced and made into handouts. Both processes, enlarging and reducing, require special facilities, and will involve additional costs.

……

Answer the following questions about graphic illustrations.

1. Name two types of graphic illustrations commonly used by instructors.

a. *any of the following -- charts, graphs,*

b. *diagrams, or blueprints*

2. Place a check mark (✓) beside each of the following which are design principles of good graphic illustrations.

____ a. Coordination.

__✓__ b. Balance.

__✓__ c. Unity.

__✓__ d. Emphasis.

3. What are two processes you can utilize to make commercial graphics more visible?

a. *enlarging*

b. *reducing*

……

Overhead Transparencies: While there are a number of techniques used to make overhead transparencies, we shall discuss that process which can be done entirely by hand. Materials and tool required to make overheads are clear acetate sheets (.005" - .010" thick); cardboard frames or mounts; and colored felt pens (fine- and broad-tipped).

A convenient transparency size, made on 8-1/2" x 11" acetate sheet, is 7-1/2" x 9-1/2" when mounted in a cardboard frame. The transparency is normally projected with the 9-1/2" dimension horizontal because it is difficult to view some parts of vertically oriented transparencies in rooms with low ceilings or suspended lighting fixures.

Verbal content for a transparency should be limited to 15 or 20 words. A good guideline would be four words/line, no more than five lines/transparency. Minimum letter height (for lower-case letters) should be about 1/5" in height.

All felt pens produce transparent colors and therefore are suitable for making transparencies. Fine-tipped felt pens are designed for drawing lines and writing, while broad-tipped pens are useful for coloring areas. Pens should be used lightly since some inks tend to run.

Ink in felt pens can either be permanent-type or water-base. Permanent-type inks are preferred since they do not smear if accidently touched. They can be removed if you use a plastic cleaner or other solvent (e.g., lighter fluid). Water-based felt pens should be used if you want to remove the writing afterwards, or if you have a limited number of acetate sheets that you must reuse again and again. The difficulty with many water-based inks, however, is that they have a tendency to "ball up" and not give a solid line.

You can also use grease pencils (china markers) on overheads. These are not transparent and will project black, however, markings tend to be streaky. Grease pencil marks can be rubbed off the acetate with a clean, soft cloth.

Overhead transparencies of charts or graphs can be prepared quickly by using transparent-color tapes or dry-transfer letters. When using these materials, be sure that they are transparent. Use a grid sheet or graph paper under the acetate as a guide for placement and alignment of the tape and letters.

……

Answers for Self-Instructional Reading #2
Page Six

Answer the following questions about overhead transparencies.

1. The finished size of an overhead transparency mounted in a cardboard frame will be: (check one.)

   ____ a. 8-1/2" x 11"

   ____ b. 7-1/2" x 11"

   ____ c. 9" x 10"

   ✓ d. 7-1/2" x 9-1/2"

2. Verbal content for a transparency should be limited to 15 or 20 words.

3. Place a check mark (✓) beside each of the following which are commonly used when preparing overheads.

   ✓ a. Felt pens.

   ____ b. Ballpoint pens.

   ✓ c. Grease pencils.

   ____ d. Graphite pencils.

   ____ e. Masking tape.

   ✓ f. Transparent dry-transfer letters.

4. Which type of writing instrument produces the most uniform line on an acetate transparency?

   ____ a. Felt pen with water soluble ink.

   ____ b. Ballpoint pen.

   ✓ c. Felt pen with permanent ink.

   ____ d. Grease pencil.

   ____ e. Graphite pencil.

. . . .

Slides. The equipment you need to make a slide series is: any 35mm camera, color film, and some photography "know-how." With these tools you can go into a water treatment facility and take the pictures of procedures/ equipment you need to supplement instruction. If you do not have the photography skills and knowledge necessary, but need the slides, you may consider hiring a photographer and serving as director.

Once you have taken the pictures, you should evaluate them for the following features:

- FOCUS - Is everything in the picture sharp and clear - easily visible?
- EXPOSURE - Is the picture too light or too dark?
- BALANCE - Is the subject or point of interest in the center of the picture?
- QUALITY - Is the slide good in terms of color, contrast, and composition?
- CONTENT - Does the slide show what you want it to show?
  - Does it show it from the proper perspective or point of view?
  - Is the slide an accurate representation?

Once you have your slide series arranged in a logical order, you can provide the narration yourself. Narration can be spontaneous, in that you explain the pictures in your own words each time they're shown, or you can develop a narration outline to structure content and provide continuity from one showing to another. The following are some suggestions for developing narration:

- Narration should make direct reference to picture content. Explain picture details and provide transitions from one slide to another.
- Keep sentences short. Use simple, straightforward English as in conversation.
- Remember that one part of the narration may include several slides.

. . . .

Answer the following questions about slides.

1. List the three things you need to make slides.

   a. 35mm camera

   b. color film

   c. photography "know-how"

2. Place a check mark (✓) beside each of the following which is an evaluation criterion for slides.

   ____ a. Quantity.

   ✓ b. Focus.

   ✓ c. Exposure.

   ____ d. Consistency.

   ✓ e. Content.

3. Narration should supplement the slides by discussing things not shown in the picture.

   ____ a. True.

   ✓ b. False.

. . . .

Category 2

Category 2 consists of those media you, as an instructor, obtain for a particular purpose from an outside source. Films (16mm or 8mm), slide/tape programs, and video cassettes are examples of media usually rented or purchased for classroom use.

When going to an outside source for media, you may be in the situation of obtaining a medium without knowing exactly what you are getting. Therefore, you should always preview media before using it. Some things to look for when previewing are.

- Does the medium fit the lesson objectives?
- Is content accurate and up-to-date?
- Is the medium in good condition?

The seemingly "perfect" film in a catalog may arrive in poor condition, or may be completely irrelevant to the lesson. If the medium does not meet any of your criteria, you may have to forgo using it. Remember, your lesson plan should not be built around a medium--it should start with training objectives. Media should play only a supporting role.

If the medium meets most of your criteria, you should review it again, this time for instructional purposes. You should review the medium so that you: 1) can prepare a good introduction (noting things students should look for) 2) become familiar with content (to answer questions) and 3) can prepare discussion questions.

Category 3

Category 3 consists of media which are part of a pre-developed training program. These media often are an inherent part of the training package. Failure to use them may result in an incomplete training program. For example, the medium may be the means for communicating a major part of the knowledge requirement. Thus, it is to your advantage and convenience, as an instructor, to utilize the media provided with an instructional package.

As with Category 2 materials, however, pre-developed programs should be previewed to determine:

1. Appropriateness to your instructional objectives.
2. Quality of media used.

Any program which does not meet your objectives or contains very poor quality media should not be used.

. . . .

Answers for Self-Instructional Reading #2
Page Ten

Answer the following questions about Category 2 and Category 3.

1. List two examples of media usually obtained from an outside source.

   a. *any of the following: films,*

   b. *slide/tape or videotape*

2. Previewing a medium is recommended only to familiarize yourself with the equipment.

   ____ a. True.

   _✓_ b. False.

3. Place a check mark (✓) beside each of the following reasons for reviewing the medium for instructional purposes.

   ____ a. To help formulate objectives.

   _✓_ b. To prepare discussion questions.

   _✓_ c. To become familiar with content.

   ____ d. To help construct lesson plans.

4. An instructor should preview pre-developed program media.

   _✓_ a. True.

   ____ b. False.

   If True, what should the preview determine?
   Appropriateness to your instructional objectives and quality of media used.

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If False, why not?

INSTRUCTIONAL MATERIALS

Lesson 7. Preparing Simple Visual Aids

Self-Instructional Reading #2

As an instructor, you will encounter three categories of media: 1) those you prepare yourself, 2) those you obtain for a particular purpose from an outside source, and 3) those which are part of a pre-developed training program. This reading will discuss all three categories, but will focus on the first by presenting features and specifications of media you can prepare yourself.

Throughout this reading assignment are check questions based on content you have been reading. These questions are not tests of your ability, but simply tools designed to help you learn the material you are reading. No answer key is provided. All answers can be found in the text preceding the questions. If you have difficulty answering a question, look back over the material until you find the correct answer. It is important that you try to answer each question before you look back over the material.

Category 1

Media you can easily prepare yourself are:

- flip chart.
- graphic illustrations.
- overhead transparencies.
- slide series.

The basic feature of an effective flip chart is that it, and what is written on it, be visible to everyone in the classroom. Visibility involves using proper writing instruments and techniques.

You should use dark colored, wide-tipped felt markers on a flip chart. Do not use pencils, ballpoint pens, or felt tips designed for everyday use since they do not make heavy, wide lines which can be seen at a distance. Blue or black are the suggested colors to use. You may wish to use other colors to highlight or contrast ideas or drawings. Just make sure the color is visible to all. A way of checking color visibility is to write a word on the flip chart with each marker you intend to use. Walk to the back of the room, and if you can easily read each word, the colored marker is suitable. This is also a way of checking if your writing is legible.

How you write on a flip chart is very important. As stated above, you must write large enough to be seen from the back of the classroom. But writing is the wrong word to use, since you should always, PRINT.

When PRINTING on a flip chart:

- Use all capital letters for short titles and labels. For longer captions (five or more words) or subtitles, use lower-case letters with appropriate capitals since lower-case letters are more easily read.
- Put subject matter in outline form whenever possible.
- Limit the usage of prepositions (a, an, the, etc.) in titles and headings.
- Allow adequate space between words and lines. Too much or too little space makes reading difficult.

. . . .

Answer the following questions about flip charts.

1. Which of the following features is basic to effective utilization of a flip chart?

    _____ a. Visibility.

    _____ b. Using an outline format.

    _____ c. Having it prepared in advance.

2. An advantage of using a flip chart is that you can use any writing instrument which is convenient.

    _____ a. True.

    _____ b. False.

3. Which of the following is NOT an important factor to consider when preparing a flip chart?

_____ a. Always PRINT.

_____ b. Use an outline format whenever possible.

_____ c. Allow adequate space between lines.

_____ d. Use a marker with yellow ink when desiring to highlight a specific word.

_____ e. Use all capital letters at all times.

. . . .

Graphic Illustrations: Examples of graphic illustrations commonly used in the classroom are charts, graphs, diagrams, and blueprints.

When preparing graphic illustrations, you should be aware of basic design principles that can be applied in these and other media situations. These design principles include: simplicity, unity, emphasis, and balance.

Simplicity:

- Present only one idea at a time.
- Subdivide or redesign lengthy or complex information into a number of easy-to-read and easy-to-understand related materials.
- Drawings should be bold, simple, and contain only key details.

Unity:

- Achieved by: overlapping elements.
  using pointing devices (arrows).
  visual tools (connecting lines, color coding similar items, using similar shapes, etc.).

Emphasis:

- The need to emphasize an element can be achieved by using size (generally larger) or different shape or color.

Balance:

- Arrange elements to create an equilibrium (do not draw everything in the upper left-hand corner).
- Keep side margins equal, with a somewhat greater area at the bottom than at the top.

When using "commercial" graphics, such as water plant blueprints or diagrams, be sure the fine lines of these graphics are visible to all the students. If they are, these graphics can be mounted on cardboard or poster board and displayed in front of the classroom. If they are not visible, you may wish to have them, or certain sections, enlarged. Another alternative would be to have the entire blueprint/diagram, or sections of them, reduced and made into handouts. Both processes, enlarging and reducing, require special facilities, and will involve additional costs.

……

Answer the following questions about graphic illustrations.

1. Name two types of graphic illustrations commonly used by instructors.

   a. ____

   b. ____

2. Place a check mark (✓) beside each of the following which are design principles of good graphic illustrations.

   _____ a. Coordination.

   _____ b. Balance.

   _____ c. Unity.

   _____ d. Emphasis.

3. What are two processes you can utilize to make commercial graphics more visible?

   a. ____

   b. ____

……

Overhead Transparencies: While there are a number of techniques used to make overhead transparencies, we shall discuss that process which can be done entirely by hand. Materials and tool required to make overheads are clear acetate sheets (.005" - .010" thick); cardboard frames or mounts; and colored felt pens (fine- and broad-tipped).

A convenient transparency size, made on 8-1/2" x 11" acetate sheet, is 7-1/2" x 9-1/2" when mounted in a cardboard frame. The transparency is normally projected with the 9-1/2" dimension horizontal because it is difficult to view some parts of vertically oriented transparencies in rooms with low ceilings or suspended lighting fixures.

Verbal content for a transparency should be limited to 15 or 20 words. A good guideline would be four words/line, no more than five lines/transparency. Minimum letter height (for lower-case letters) should be about 1/5" in height.

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Answer the following questions about overhead transparencies.

1. The finished size of an overhead transparency mounted in a cardboard frame will be: (check one.)

   _____ a. 8-1/2" x 11"

   _____ b. 7-1/2" x 11"

   _____ c. 9" x 10"

   _____ d. 7-1/2" x 9-1/2"

2. Verbal content for a transparency should be limited to ___________ or ___________words.

3. Place a check mark (✓) beside each of the following which are commonly used when preparing overheads.

   _____ a. Felt pens.

   _____ b. Ballpoint pens.

   _____ c. Grease pencils.

   _____ d. Graphite pencils.

   _____ e. Masking tape.

   _____ f. Transparent dry-transfer letters.

4. Which type of writing instrument produces the most uniform line on an acetate transparency?

   _____ a. Felt pen with water soluble ink.

   _____ b. Ballpoint pen.

   _____ c. Felt pen with permanent ink.

   _____ d. Grease pencil.

   _____ e. Graphite pencil.

. . . .

Slides. The equipment you need to make a slide series is: any 35mm camera, color film, and some photography "know-how." With these tools you can go into a water treatment facility and take the pictures of procedures/equipment you need to supplement instruction. If you do not have the photography skills and knowledge necessary, but need the slides, you may consider hiring a photographer and serving as director.

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- Narration should make direct reference to picture content. Explain picture details and provide transitions from one slide to another.
- Keep sentences short. Use simple, straightforward English as in conversation.
- Remember that one part of the narration may include several slides.

. . . .

Answer the following questions about slides.

1. List the three things you need to make slides.

    a. ______________________________

    b. ______________________________

    c. ______________________________

2. Place a check mark (✓) beside each of the following which is an evaluation criteria for slides.

    _____ a. Quantity.

    _____ b. Focus.

    _____ c. Exposure.

    _____ d. Consistency.

    _____ e. Content.

3. Narration should supplement the slides by discussing things not shown in the picture.

    _____ a. True.

    _____ b. False.

. . . .

Category 2

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As with Category 2 materials, however, pre-developed programs should be previewed to determine:

1. Appropriateness to your instructional objectives.
2. Quality of media used.

Any program which does not meet your objectives or contains very poor quality media should not be used.

. . . .

Answer the following questions about Category 2 and Category 3.

1. List two examples of media usually obtained from an outside source.

   a. ____

   b. ____

2. Previewing a medium is recommended only to familiarize yourself with the equipment.

   _____ a. True.

   _____ b. False.

3. Place a check mark (✓) beside each of the following reasons for reviewing the medium for instructional purposes.

   _____ a. To help formulate objectives.

   _____ b. To prepare discussion questions.

   _____ c. To become familiar with content.

   _____ d. To help construct lesson plans.

4. An instructor should preview pre-developed program media.

   _____ a. True.

   _____ b. False.

   If True, what should the preview determine?

   ____

   ____

   ____

   ____

If False, why not?

____

____

____

____

EXERCISE 7-1

Instructions: In this exercise you will be asked to evaluate samples of each of three types of media: flip chart, overhead transparencies, and slides. You will use the evaluation dimensions described for each medium as presented in your handbook. As each sample is presented, select the scaled value for each dimension that best represents your judment and check those values on the Media Evaluation Sheet.

Product: At the end of this exercise you will have a completed Media Evaluation Sheet containing entries for the flip chart, overhead, and 35mm slide.

Time: You will be given approximately three minutes to judge each sample.

LESSON TITLE:

Lesson 8. Evaluating Instruction

PURPOSE:

To provide participants with the skills and knowledges which underlie the preparation of audiovisual aids.

TRAINING OBJECTIVE

GIVEN:

Sample audiovisual aids.

ACTION:

Identify those audiovisual aids which meet and do not meet established criteria for "good" audiovisuals, and why.

STANDARD:

Correctly identify "good" and "poor" audiovisuals, and be 90% correct in describing how to improve inadequate audiovisuals.

INSTRUCTIONAL TECHNIQUES:

1. Self-instructional reading
2. Group exercise/discussion

PARTICIPANT MATERIAL:

1. Participant's Handbook
2. Available instructional resources

INSTRUCTIONAL MATERIAL:

1. Self-instructional reading
2. Slides/projector
3. Overhead transparencies/projector
4. Flip chart

REFERENCES:

Kemp, Jerrold E. Planning and producing audiovisual materials (2nd ed.) Scranton, PA: Chandler Publishing Company, 1968.

TIME:

2 hours

ACTIVITIES:

1. Self-instructional reading
2. Group exercise--critique sample audiovisuals
3. Summary

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INSTRUCTIONAL EVENTS

I. EARLY STAGE

Self-instructional reading assignment with study questions, outlining the criteria for preparing and/or evaluating media.

II. INTERMEDIATE STAGE

Participants will perform an individual exercise in which they will use a checklist to critique sample media. Group discussion of media evaluations will follow.

III. FINAL STAGE

Activity in which participants will prepare media to support course/lesson(s) they currently teach.

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	I. Introduction.	
	A. Purposes of Evaluation (Testing).	
	1. Evaluate instruction.	
	2. Evaluate learning.	
	3. Provide feedback.	
	B. This unit will include.	
	1. Guidelines for determining appropriate test format.	
	2. Guidelines for construction of test items.	
	3. Uses to which a test may be put.	
	II. Development.	
	A. Discuss two types of evaluation:	
	1. Knowledge.	Overhead 8-1
	2. Skills-performance.	
	B. Test format.	
	1. Dependent upon:	
	a. Whether a skill or knowledge is required to complete the task. (Or both.)	
	b. Time, cost considerations.	
	2. Possible formats.	
	a. Written (objective).	Overhead 8-2
	b. Performance.	
	c. Mixed.	
	C. Describe types of written-objective test items.	Overhead 8-3
	1. Short-answer.	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	2. True-False.	
	3. Multiple choice.	
	4. Matching.	
	D. Describe forms of performance testing situations.	Overhead 8-4
	1. Identification.	
	2. Simulation.	
	3. Work samples.	
	4. Advantages/disadvantages.	Overhead 8-5
	E. Handout.	Handout 8-1
	1. Instruct participants to turn to Handout 8-1.	
	2. Allow participants adequate time to review Handout 8-1.	
	III. Individual Exercise.	Exercise 8-1
	A. Have participants turn to Exercise 8-1.	
	B. Explain that there are three parts to the exercise.	
	1. Parts One and Two Directions are self-explanatory	
	2. Part Three.	
	a. Read over directions.	
	b. Explain that any type of test item is acceptable, as long as it is written within the guidelines as found in Handout 8-1.	
	C. Upon completion of the exercise.	
	1. Part One. Go over answers and pro-	
	Go over answers and provide feedback.	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	2. Part Two. Discuss items and provide feedback. D. Ask for questions or comments. IV. Summary. Review the major points of the unit. 1. Two types of evaluation. 2. Test format. 3. Written test items. 4. Performance testing situations. V. Work Assignment. A. Participants are to develop evaluation tools for the course(s) they presently teach, using the materials they have developed (objectives, lesson plans, etc.). B. Instructor will be available as resource person. C. All participants must complete their test questions for at least one entire lesson, and have them reviewed by an instructor.	

INSTRUCTIONAL MATERIALS

Lesson 8. Evaluating Instruction

TWO TYPES OF EVALUATION

1. KNOWLEDGE
2. SKILLS

Overhead 8-2

TEST FORMATS

1. WRITTEN (OBJECTIVE)
2. PERFORMANCE
3. MIXED

TYPES OF OBJECTIVE TEST ITEMS

- SHORT–ANSWER
- TRUE–FALSE
- MULTIPLE–CHOICE
- MATCHING

FORMS OF PERFORMANCE TESTING SITUATIONS:

1. Identification

2. Simulation

3. Work Samples

Overhead 8-5

PERFORMANCE TEST

ADVANTAGES	DISADVANTAGES
• Actively Involves Student In Actual Skills Practice	• Lengthy Materials Development Time
• Permits Students To Apply Learning In Situations That Simulate The Real World	• Requires Extensive Class Time For Guided Practice Of New Skills

HANDOUT 8-1

GENERAL PRINCIPLES OF TEST CONSTRUCTION

- MUST ADEQUATELY ASSESS THE TRAINING OBJECTIVES.
- USE ONLY TWO OR THREE TYPES OF ITEMS.
- ITEMS SHOULD BE CLEAR AND CONCISE.
- READING RATE AND COMPREHENSION SHOULD NOT ADVERSELY INFLUENCE THE TEST SCORE.
- INSTRUCTIONS ARE TO BE CLEAR AND EXPLICIT.

GUIDELINES FOR GENERATING PERFORMANCE TEST SITUATIONS

1. Give students adequate instructions so that they clearly understand the performance being measured.
2. All drawings, forms, etc., should be clearly labeled.
3. Require students to explain procedures as they are being performed.
4. Set up observable objective criteria by which to assess the students' performance.
5. Test only those aspects of performance which are important to the job.

RULES FOR CONSTRUCTING ESSAY TEST QUESTIONS

1. The directions must be clearly written.
2. Language should be precise and unambiguous.
3. To assure equality of information, do not provide optional questions.
4. Avoid open-book essay tests.
5. Carefully define the scope of the problem so that students will be writing appropriate answers.
6. Prepare correct answers and a point system for each subpart, if appropriate.
7. Score responses to each question for the entire class before scoring subsequent questions.
8. Use essay questions only to assess information for which the essay is the appropriate test form.

RULES FOR CONSTRUCTING MATCHING QUESTIONS

1. Item premises and responses should all be within a well-defined and limited content area.
2. The number of responses should be greater than the number of premises.
3. Avoid cueing the student by making the correct answer the longest phrase.
4. There should be no fewer than 5 and no greater than 15 responses.
5. All premises and responses should be on one page.
6. The directions for matching must be clearly stated.
7. Responses should be arranged to keep search time to a minimum.
8. Provide a convenient technique for answering and scoring.

RULES FOR CONSTRUCTING MULTIPLE-CHOICE TEST QUESTIONS

1. The question should be constructed so that only one choice is correct.
2. Word all alternatives so that they are grammatically consistent with the premise.
3. Word the alternatives so that the correct response is neither consistently longer nor shorter than the incorrect response.
4. Have at least three but no more than five alternatives.
5. Avoid negatively stated items.
6. Place the correct alternative randomly.
7. All incorrect answers should be plausible.

RULES FOR CONSTRUCTING TRUE-FALSE TEST QUESTIONS

1. The statement should be entirely true or entirely false.
2. A statement should not be false due to a trivial detail.
3. Avoid verbatim quotes from text material.
4. Avoid the use of descriptive words which may give away the correct answer.
5. Avoid statements phrased negatively.
6. Avoid patterning of answers.

RULES FOR CONSTRUCTION OF SHORT-ANSWER TEST QUESTIONS

1. For incomplete sentence items, omit only significant words.
2. For incomplete sentence items, always leave enough clue words so the examinee can supply the correct answer.
3. The length of the blank space should be constant, so that it does not provide a cue to the correct answer.
4. Score one point per blank.
5. Arrange blanks so that they will be easy to score.
6. Avoid requesting verbatim quotes from text material.
7. Prepare a scoring key listing all acceptable answers.

COMPARISON OF PERFORMANCE AND WRITTEN TEST ITEMS

PERFORMANCE TEST ITEMS	WRITTEN TEST ITEMS
Require individual to accomplish a job-like task under controlled conditions.	Require the individual to demonstrate knowledge by responding to various types of written questions.
Emphasize non-verbal aspects.	Emphasize verbal or symbolic aspects.
May require individual to look up, read, and use certain technical materials (for example, job aids).	May require individual to look up, read, and use certain technical materials (for example, reference materials).
Items are skills the trainee must perform, or the decisions he must make on the job.	Items are content the trainee must know to perform or make decisions on the job.
Items are dependent on sequence in which they are presented. Errors early in the sequence may affect final outcome of the task.	Items are independent questions, not dependent on sequence. Errors on one item will not affect performance on another item.

LESSON TITLE:

Lesson 9. Controlling Classroom Learning

PURPOSE:

To review the basic elements of any learning situation, and explain how the instructor controls the learning environment.

TRAINING OBJECTIVE

GIVEN:

Given examples of learning situations.

ACTION:

Participants will identify those elements of the classroom situation that will influence the students' learning.

STANDARD:

Correctly identify all negative/positive influences in class discussion and after reading Handout 9-1.

INSTRUCTIONAL TECHNIQUES:

1. Lecture/Overheads
2. Group discussion
3. Performance/Application

PARTICIPANT MATERIAL:

1. Participant's Handbook
2. Handout 9-1

INSTRUCTIONAL MATERIAL:

1. Overhead projector
2. Overhead transparencies

REFERENCES:

TIME:

1 hour

ACTIVITIES:

1. Lecture/Overheads
2. Individual discussion
3. Group discussion

INSTRUCTIONAL EVENTS

I. EARLY STAGE

Lecture describing the elements of learning and ways to manipulate them to optimize learning.

II. INTERMEDIATE STAGE

Examples will be given of typical ways in which learning is either facilitated or decreased by specific instructor behaviors.

III. FINAL STAGE

Participants will identify specific instructor behaviors that inhibit students' learning.

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	I. Introduction.	
	A. As the instructor who is in control of the learning environment, you must consider which are the most effective methods and media to promote the desired learning.	
	B. Before we discuss selection principles, let's talk a minute about the nature of learning.	
	1. Definition. Associations, typically between stimuli and responses.	
	2. Nature of. One cannot not learn.	
	3. Since you cannot prevent learning, it is up to you as a trainer to bring it under your control.	
	II. Development.	
	A. Elements of a learning situation.	
	1. Trainer must be aware of the basic elements of a learning situation to bring them under control.	
	2. The basic elements are:	Overhead 9-1
	a. Stimuli. Explain types.	Overhead 9-2
	b. Attention.	
	1) One must be aware of the stimuli for optimal learning.	
	2) Can also be considered motivational element.	
	c. Responses. Explain types.	Overhead 9-3
	d. Feedback.	Overhead 9-4
	1) Define also as reward, reinforcement.	
	2) Explain types.	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	B. Optimized learning consists of:	
	1. Optimized stimulus conditions.	Overhead 9-5
	a. Attractive.	
	b. Distinctive.	
	c. Concise.	
	d. Meaningful.	
	e. Appropriately timed, i.e., don't give until needed.	
	f. Environmental situation conducive to learning.	
	g. Audio--should be audible, concise, attractive.	
	h. Multimedia improves retention.	Overhead 9-6
	i. Should be considered for pacing.	
	2. Optimize reponse conditions.	Overhead 9-7
	a. Learning situations which require observable quantifiable responses can be controlled to produce faster learning than ones which don't.	
	1) This is primarily due to the ability to provide feedback.	
	2) Additional retention is gained by using different muscles--thus if we hear, see and say something, we are less likely to forget it--than if we only hear it.	
	b. Responses required should be appropriate to the objectives, and ultimately the job.	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	c. Frequent responding with feedback (short of fatigue) improves learning.	
	d. Responding should be appropriate to the stage of learning--don't require response for which trainee has not received sufficient background.	
	e. Can also be usea to vary pace thereby improving attention.	Overhead 9-8
	3. Provide feedback.	
	a. Should be distinctive--the trainee should recognize it when it comes.	
	b. Should be immediate.	
	c. When a reward is used, it should be meaningful to the trainee.	
	C. Relationship between stages of learning and instructional method.	
	1. Describe the arbitrary division of learning into early, middle, and late stages.	Overhead 9-9
	2. Describe the relationships between these stages and instructional methods.	Overhead 9-10
	D. Distribute Handout 9-1, review instructions. Allow five minutes reading time and discuss participant answers.	Handout 9-1
	E. Summarize:	
	Learning occurs constantly in humans. Being aware of the elements of a learning situation, you can bring many of those elements under your control to optimize learning in a training situation.	

INSTRUCTIONAL MATERIALS

Lesson 9. Controlling Classroom Learning

BASIC ELEMENTS OF LEARNING

- STIMULUS CONDITIONS
- ATTENTION
- RESPONSES
- FEEDBACK

STIMULUS CONDITION INCLUDE:

ALL THE SENSES

- SIGHT
- SOUND
- SMELL
- ETC.

EMOTIONS

RESPONSES INCLUDE:

- MOVEMENTS OF MUSCLES
- GLANDULAR RESPONSES
- THOUGHTS

FEEDBACK MAY TAKE MANY FORMS:

- VERBAL COMMENT
- WRITTEN COMMENT
- TEST RESULTS
- TASK COMPLETION
- ERRORS
- REWARDS

STIMULUS SHOULD BE:

- DISTINCTIVE
- MEANINGFUL
- APPROPRIATELY TIMED

ADULTS RETAIN:

- 10% OF WHAT THEY READ
- 20% OF WHAT THEY HEAR
- 30% OF WHAT THEY SEE
- 50% OF WHAT THEY SEE AND HEAR

RESPONSES SHOULD BE:

- OBSERVABLE
- QUANTIFIABLE
- APPROPRIATE FOR THE TASK

FEEDBACK SHOULD BE:

- DISTINCTIVE
- IMMEDIATE
- APPROPRIATE TO THE LEARNER

STAGES OF LEARNING:

- EARLY STAGE
- INTERMEDIATE STAGE
- FINAL STAGE

Overhead 9-10

METHODS OF INSTRUCTION SUGGESTED FOR THREE STAGES OF LEARNING

METHODS	EARLY STAGE	INTERMEDIATE STAGE	FINAL STAGE
Lecture	▨		
Demonstration	▨		
Discussion		▨	▨
Performance		▨	▨

HANDOUT 9-1

SETTING: A ten-week Basic Operator course is being offered at the local high school as one of a number of other adult education couses. Class meets once a week from 7 PM to 10 PM. Class size is 50 trainees. Instructor is Mr. P. Pipewrench.

6:59 Mr. Pipewrench arrives in the classroom, sets lecture notes on podium, props open class door, and opens window at the rear of the classroom.

7:02 Distributes two handouts which include background information, problems, and the calculations for their solutions.

7:04 Begins lecture.

7:20 Four trainees in the rear of the room put on their jackets.

7:50 Holds up 11"X17" photocopy of a water plant blueprint and refers to assorted valves and pumps. Lecture continues.

7:53 Mr. Johnson raises hand to question the instructor.

7:55 Mr. Johnson lowers hand.

8:00 Creative sewing class across the hall takes a ten-minute break.

8:15 "Preparing your income tax" class in the adjacent room takes a ten-minute break.

8:23 Instructor closes the classroom door.

8:30 Lecture is stopped and ten-minute break announced.

8:31 Instructor departs for teacher's room.

8:40 Class resumes, door is again propped open. Instructor reads the material on Handout 1, including calculations.

8:50 Two additional trainees put on their jackets.

9:05 Instructor asks the best student, Mr. Smith to read the material and calculations on Handout 2.

9:07 Mr. Jones raises hand.

9:09 Mr. Jones lowers hand.

9:10 Creative sewing class takes a ten-minute break.

9:15 Tax class takes a ten-minute break.

9:16 Mr. Parson raises hand.

9:17 Instructor explains that since time is short, any questions regarding the handouts will be answered next week, hopefully.

9:18 Lecture resumes.

9:59 Lecture concluded.

10:00 Instructor announces that the answer key for last week's test has been prepared and is available for trainee review for ten minutes after class.

10:01 Instructor announces that last week's test will be graded and returned next week.

10:02 Instructor asks if there are any questions.

10:03 Class is dismissed.

In what ways has the instructor violated the principles for optimizing trainee learning with respect to the elements of a learning situation: stimulus, attention, response, and feedback?

LESSON TITLE:

Lesson 10. Training Delivery: Lecture

PURPOSE:

To provide participants a review of the correct and incorrect instructor behaviors when using the instructional method of lecture.

TRAINING OBJECTIVE

GIVEN:

1. Good and bad demonstrations of lecture technique.
2. Checklist of instructor behaviors.

ACTION:

Identify correct and incorrect instructor behaviors, using the checklist provided.

STANDARD:

1. Identifies correct and incorrect aspects of each of the demonstrations with 90% accuracy.
2. Reach agreement on an objective and practical assessment of instructor skills.

INSTRUCTIONAL TECHNIQUES:

1. Lecture/Discussion
2. Performance/Application

PARTICIPANT MATERIAL:

Instructor Evaluation Checklist

INSTRUCTIONAL MATERIAL:

1. Videotape
2. Televison set
3. Videotape recorder

REFERENCES:

TIME:

ACTIVITIES:

1. Lecture/Discussion of problems of evaluating instructor performance.
2. Group exercise--using evaluation checklist and videotape demonstration of instructor behavior.

INSTRUCTIONAL EVENTS

I. EARLY STAGE

Brief lecture/discussion and handout, describing good/bad instructor behaviors.

II. INTERMEDIATE STAGE

Participants view two (2) demonstrations of instructor behaviors, (one good and one bad example of lecture). Using the checklist provided, they will evaluate the demonstration and identify correct/incorrect instructor behaviors.

III. FINAL STAGE (Optional)

Participants will apply the checklist in evaluating other instructors while they administer a brief practice lecture.

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	I. Introduction. A. Explain that while a large portion of effective training is the result of the application of sound instructional development procedures (e.g., task analysis), it is also extremely important that developed training is delivered in a manner that will create an atmosphere conducive to learning. In a previous lesson (Lesson 9) we have discussed general classroom techniques which an instructor can use to increase trainee motivation, attention and learning. B. In addition, common instructional techniques can be effectively or ineffectively used. This lesson will focus upon effective and ineffective delivery of the classroom lecture. II. Development. A. (Note: Parts A and B can be conducted by dividing your class into groups, posing the discussion questions and having each group write their poor/good behaviors their flip charts for total class discussion.) Conduct a discussion focussing upon behaviors exhibited by an instructor while delivering a lecture which: 1. Decrease student motivation. 2. Decrease student attention. 3. Interfere with learning. The discussion can stem from your instructor's experiences when they were students in high school or college. Keep the discussion focussed upon specific behaviors rather than non-behavioral characteristics (i.e., "the instructor never addressed students by name," rather than "the instructor was distant"). List comments on flip chart or chalk board.	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	B. Once negative lecture behaviors have been listed, ask the class to review each negative behavior and generate a positive instructor behavior which if practiced will result in an environment more conducive to student learning.	
	C. Distribute copies of the Instructor Skills Checklist.	Handout 10-1
	D. Compare items on the checklist with those generated during the discussion, and have the class add any new lecture behaviors to the Checklist.	
	E. Exercise 10-1. Evaluation of Lecture Behaviors.	Exercise 10-1
	1. Explain that the class will evaluate the videotape performance of an instructor delivering a lecture regarding the Safe Drinking Water Act.	
	2. Explain that in Part One of the tape, many lecture behaviors are poor, and the class is to use the Checklist and note paper to identify those specific behaviors which are instructionally poor.	
	3. Review your class results with those listed in Part One of the Exercise Answer Sheet.	
	4. Play Part Two of the tape to let the class see how the lecture has been improved by delivering the lecture attending to the more positive behaviors listed in the Checklist.	
	Note: You may want each of your instructors to prepare a brief lecture presentation for evaluation by other class members to provide feedback on their	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	lecture skills. If you should choose this option make sure that: 1. Adequate time is allowed for preparation. 2. Feedback includes comments about BOTH positive and negative behaviors. 3. Feedback is kept on a friendly, constructive level. III. Summary. A. Summarize the lesson by again stressing the importance of positive instructor behaviors in the delivery of classroom lectures for student learning. B. Review those behaviors on the Checklist identified by your class as being the more important behaviors to exhibit while delivering a lecture.	

EXERCISE 10-1

Instructor Skills

In this exercise you will be asked to evaluate the delivery of instruction using the lecture technique. The delivery has been videotaped in two parts. In the first part, the instructor will be exhibiting many negative behaviors which are known to interfere with student learning. During this part, you are to identify the instructor's negative behaviors using the Instructor Skills Checklist provided. Write any additional comments regarding the delivery on the back of the Checklist for discussion following the conclusion of the tape.

EXERCISE 10-1 SUGGESTED ANSWER SHEET
CHECKLIST OF INSTRUCTOR SKILLS: LECTURE

Instructor: ______________________

Topic: ______________________

Evaluator: ______________________

	RATING				
	Exc.	Good	Adeq.	Poor	Not Observed
LECTURE CONTENT					
States the purpose and/or provides transition.				✓	
Presents material in an organized manner.				✓	
Emphasizes important items that may appear on test.				✓	
Uses appropriate and meaningful examples.				✓	
Asks pertinent questions correctly.				✓	
Reviews prior points in summary.					✓
INTERACTIONS WITH STUDENTS					
Puts students at ease.		✓			
Establishes eye contact with all students.				✓	
Encourages active participation through feedback.				✓	
Rewards student's comments.				✓	
Leads erring student to correct answer.				✓	
Controls class without dominating.					✓
Avoids negative non-verbal behaviors.				✓	
TEACHING AIDS (SCREEN, CHALKBOARD, FLIP CHART, EQUIPMENT)					
Clearly visible at all times.				✓	
Sufficient viewing time allowed.				✓	
Aid content coordinated with lecture topic.				✓	
Unobtrusive equipment operation/handling of aids.					✓
SPEAKING VOICE					
Clearly audible for entire class.		✓			
Varied voice inflection.				✓	
Understandable vocabulary; no jargon.			✓		
Holds students' attention.				✓	
Evenly paced; neither fast nor slow.			✓		

EXERCISE 10-1

Lecture: Suggested Answer Sheet

In addition to the behaviors referenced on the checklist, the instructor was guilty of the behaviors below which interfered with classroom learning: (Comments below are listed in the sequence in which they occur in the tape.)

1. Instructor wrote the discussion question on the flip chart long before it was ever referred to in the lecture, thereby distracting the class.

2. When writing on the flip chart, the instructor repeatedly stood in front of the writing so that the class was unable to see it.

3. The instructor asked where the previous class had ended so that he could begin in the right place. This type of "forgetfulness" conveys an attitude that the class and the topics for learning are not very important--thereby lowering student instruction.

4. The instructor was very disorganized--conveying unpreparedness.

5. The instructor failed to provide an introduction to the class which explained how the present lesson was related to the last lesson or its place in on-going instruction. The contents therefore will not be remembered as well as if the lesson had properly been introduced.

6. Playing with the pointer, swaying and constantly moving around were all distracting.

7. The quotation, read verbatim, was read in a monotone losing the class's attention.

8. Distributed a handout long before it was needed, thereby distracting the student's attention from the lecture.

9. Eye contact with students was minimal.

10. Did not explain flip chart notes in sufficient detail.

11. Did not provide an adequate answer to the question raised by a class member.

12. Did not explain the instructional purpose of the worksheet nor what would be done with them upon completion.

INSTRUCTIONAL MATERIALS

Lesson 10. Training Delivery: Lecture

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EXERCISE 10-1

Instructor Skills

In this exercise you will be asked to evaluate the delivery of instruction using the lecture technique. The delivery has been videotaped in two parts. In the first part, the instructor will be exhibiting many negative behaviors which are known to interfere with student learning. During this part, you are to identify the instructor's negative behaivors using the Instructor Skills Checklist provided. Write any additional comments regarding the delivery on the back of the Checklist for discussion following the conclusion of the tape.

HANDOUT 10-1

CHECKLIST OF INSTRUCTOR SKILLS: LECTURE

Instructor: ______________________

Topic: ______________________

Evaluator: ______________________

	RATING				
	Exc.	Good	Adeq.	Poor	Not Observed
LECTURE CONTENT					
States the purpose and/or provides transition.					
Presents material in an organized manner.					
Emphasizes important items that may appear on test.					
Uses appropriate and meaningful examples.					
Asks pertinent questions correctly.					
Reviews prior points in summary.					
INTERACTIONS WITH STUDENTS					
Puts students at ease.					
Establishes eye contact with all students.					
Encourages active participation through feedback.					
Rewards student's comments.					
Leads erring student to correct answer.					
Controls class without dominating.					
Avoids negative non-verbal behaviors.					
TEACHING AIDS (SCREEN, CHALKBOARD, FLIP CHART, EQUIPMENT)					
Clearly visible at all times.					
Sufficient viewing time allowed.					
Aid content coordinated with lecture topic.					
Unobtrusive equipment operation/handling of aids.					
SPEAKING VOICE					
Clearly audible for entire class.					
Varied voice inflection.					
Understandable vocabulary; no jargon.					
Holds students' attention.					
Evenly paced; neither fast nor slow.					

LESSON TITLE:

Lesson 11. Training Delivery: Group Discussion

PURPOSE:

To provide participants a review of the correct and incorrect instructor behaviors when using the instructional method of group discussion.

TRAINING OBJECTIVE

GIVEN:

1. Good and bad demonstrations of group discussion.
2. Checklist of instructor behaviors.

ACTION:

Identify correct and incorrect instructor behaviors, using the checklist provided.

STANDARD:

1. Correctly identifies correct and incorrect aspects of each of the demonstrations with 90% accuracy.
2. Reach agreement on an objective and practical assessment of instructor skills.

INSTRUCTIONAL TECHNIQUES:

1. Lecture/Discussion
2. Performance/Application

PARTICIPANT MATERIAL:

Instructor Evaluation Checklist

INSTRUCTIONAL MATERIAL:

1. Videotape
2. Television set
3. Videotape recorder

REFERENCES:

TIME:

1.5 to 2 hours

ACTIVITIES:

1. Lecture/Discussion of problems of evaluating instructor performance.
2. Group exercise--using evaluation checklist and videotape demonstration of instructor behavior.

INSTRUCTIONAL EVENTS

I. EARLY STAGE

Brief lecture/discussion and handout, describing good/bad instructor behaviors.

II. INTERMEDIATE STAGE

Participants view two (2) demonstrations of instructor behaviors (one good and one bad example of group discussion). Using the checklist provided, they will evaluate the demonstration and identify correct/incorrect instructor behaviors.

III. FINAL STAGE

Participants will apply the checklist in evaluating other instructors while they administer a brief practice discussion.

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	I. Introduction. A. Explain that while a large portion of effective training is the result of the application of sound instructional development procedures (e.g., task analysis), it is also extremely important that developed training is delivered in a manner that will create an atmosphere conducive to learning. In a previous lesson (Lesson 9) we have discussed general classroom techniques which an instructor can use to increase trainee motivation, attention and learning. B. In addition, common instructional techniques can be effectively or ineffectively used. This lesson will focus upon effective and ineffective conduct of the group discussion in the classroom. II. Development. A. (Note: Parts A and B can be conducted by dividing your class into groups, posing the discussion questions and having each group write their poor/good behaviors their flip charts for total class discussion.) Conduct a discussion focussing upon behaviors exhibited by an instructor while conducting a group discussion: 1. Decrease student motivation. 2. Decrease student attention. 3. Interfere with learning. The discussion can stem from your instructor's experiences when they were students in high school or college. Keep the discussion focussed upon specific behaviors rather than non-behavioral characteristics (i.e., "the instructor never addressed students by name," rather than "the instructor was distant"). List comments on flip chart or chalk board.	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	B. Once negative instructur behaviors have been listed, ask the class to review each negative behavior and generate a positive instructor behavior which, if practiced, will result in an environment more conducive to student learning.	
	C. Distribute copies of the Instructor Skills Checklist.	Handout 11-1
	D. Compare items on the checklist with those generated during the discussion, and have the class add any new group discussion behaviors to the Checklist.	
	E. Exercise 11-1. Evaluation of Group Discussion Behaviors.	Exercise 11-1
	1. Explain that the class will evaluate the videotape performance of an instructor conducting a group discussion regarding the Safe Drinking Water Act.	
	2. Explain that in Part One of the tape, many instructor behaviors are poor, and the class is to use the Checklist and note paper to identify those specific behaviors which result in an instructionally poor discussion.	
	3. Review your class results with those listed in Part One of the Exercise Answer Sheet.	
	4. Play Part Two of the tape to let the class see how the discussion has been improved by conducting the discussion attending to the more positive behaviors listed in the checklist.	
	Note: You may want each of your instructors to conduct a brief discussion for evaluation by other class members to provide feedback on their discussion-	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	leading skills. If you should choose this option make sure that:	
	1. Adequate time is allowed for preparation.	
	2. Feedback includes comments about BOTH positive and negative behaviors.	
	3. Feedback is kept on a friendly, constructive level.	
	III. Summary.	
	A. Summarize the lesson by again stressing the importance of positive instructor behaviors in the conduct of group discussion in the classroom.	
	B. Review those behaviors on the Checklist identified by your class as being the more important behaviors to exhibit while conducting a group discussion.	Handout 11-1

EXERCISE 11-1

Instructor Skills

In this exercise you will be asked to evaluate the delivery of instruction using the group discussion technique. The delivery has been videotaped in two parts. In the first part, the instructor will be exhibiting many negative behaviors which are known to interfere with student learning. During this part, you are to identify the instructor's negative behaviors using the Instructor Skills Checklist provided. Write any additional comments regarding the delivery on the back of the Checklist for discussion following the conclusion of the tape.

EXERCISE 11-1 SUGGESTED ANSWER SHEET
CHECKLIST OF INSTRUCTOR SKILLS:
DISCUSSION LEADER

Instructor: ____________________

Topic: ____________________

Evaluator: ____________________

	RATING				
	Exc.	Good	Adeq.	Poor	Not Observed
DISCUSSION CONTENT					
States purpose and goals of discussion.				✓	
Reviews topics to be covered, and time limits (if any).				✓	
Provides guidance for group toward goal.				✓	
Asks pertinent questions correctly.			✓		
Summarizes conclusions reached and obtains group agreement.				✓	
Outlines required follow-up activities.					✓
INTERACTIONS WITH GROUP					
Puts group at ease; reviews grading system, if applicable.				✓	
Establishes eye contact with all members.			✓		
Encourages active participation through feedback.				✓	
Rewards members' contributions				✓	
Keeps discussion on track				✓	
Controls group without dominating.				✓	
Avoids negative non-verbal behaviors.				✓	
Clarifies differences and suggests compromises.				✓	
TEACHING AIDS (CHALKBOARD, FLIP CHART, TOPIC LIST HANDOUT)					
Clearly visible at all times.				✓	
Aid content accurately reflects discussion topics			✓		
Unobtrusive handling of aids.		✓			
SPEAKING VOICE					
Clearly audible for entire group.		✓			
Understandable vocabulary; no jargon.			✓		
Gets group's attention when necessary				✓	
Evenly paced, neither fast nor slow.		✓			

EXERCISE 11-1

Group Discussion: Suggested Answer Sheet

In addition to the behaviors specified on the Skill Checklist, the instructor was guilty of exhibiting the following behaviors which act to interfere with learning: (Note: Behaviors are listed in the approximate order in which they appear on the tape.)

1. Instructor failed to set the amount of time to be spent in discussion. More importantly, the goal/purpose and/or direction of the discussion was not specified.
2. Instructor would write on the flip chart and then stand in front of it, blocking the classes' view.
3. Fumbled when he tried to restate the discussion question.
4. When an answer was given by a trainee, the instructor translated the comment into terms that the instructor wanted. This is acceptable only if:
    a. The trainee is asked and provides consensus to the translation, and
    b. The instructor is not forcing trainee responses into a preconceived set of answers.
5. Neither trainee questions nor answers were repeated for the benefit of those who may not have heard.
6. Slight "badgering" of the class with "you're not discussing" comment. Such comments could very well lead to class hostility and intentional minimal cooperation in the learning process.
7. Permitted the class discussion to wander off the topic into an emotional area and made it worse by joining into the off-the-topic discussion himself.
8. Instructor never provided positive comments regarding trainee contributions to the discussion.
9. Instructor's repeated yawning conveyed the attitude of disinterest in the discussion.
10. Instructor failed to get all trainees involved in the discussion.

11. Instructor interrupted a trainee and failed to allow the trainee to complete the interrupted thought.

12. Instructor should have verbally expressed/recognized the emotional concern with cost of notifications and set a definite time/place for discussion of that issue, rather than to overlook the issue and then put it off to some indefinite time as was done in the tape.

13. There was no atempt at summarizing key points or to provide closure on the discussion.

INSTRUCTIONAL MATERIALS

Lesson 11. Training Delivery: Group Discussion

EXERCISE 11-1

Instructor Skills

In this exercise you will be asked to evaluate the delivery of instruction using the group discussion technique. The delivery has been videotaped in two parts. In the first part, the instructor will be exhibiting many negative behaviors which are known to interfere with student learning. During this part, you are to identify the instructor's negative behaviors using the Instructor Skills Checklist provided. Write any additional comments regarding the delivery on the back of the Checklist for discussion following the conclusion of the tape.

HANDOUT 11-1
CHECKLIST OF INSTRUCTOR SKILLS: DISCUSSION LEADER

Instructor: ______________________

Topic: ______________________

Evaluator: ______________________

	RATING				
	Exc.	Good	Adeq.	Poor	Not Observed
DISCUSSION CONTENT					
States purpose and goals of discussion.					
Reviews topics to be covered, and time limits (if any).					
Provides guidance for group toward goal.					
Asks pertinent questions correctly.					
Summarizes conclusions reached and obtains group agreement.					
Outlines required follow-up activities.					
INTERACTIONS WITH GROUP					
Puts group at ease; reviews grading system, if applicable.					
Establishes eye contact with all members.					
Encourages active participation through feedback.					
Rewards members' contributions.					
Keeps discussion on track.					
Controls group without dominating.					
Avoids negative non-verbal behaviors.					
Clarifies differences and suggests compromises.					
TEACHING AIDS (CHALKBOARD, FLIP CHART, TOPIC LIST HANDOUT)					
Clearly visible at all times.					
Aid content accurately reflects discussion topics					
Unobtrusive handling of aids.					
SPEAKING VOICE					
Clearly audible for entire group.					
Understandable vocabulary; no jargon.					
Gets group's attention when necessary.					
Evenly paced; neither fast nor slow.					

LESSON TITLE:

Lesson 12. Training Delivery: Demonstration

PURPOSE:

To provide participants a review of the correct and incorrect instructor behaviors using the instructional method of demonstration.

TRAINING OBJECTIVE

GIVEN:

1. Good and bad examples of demonstrations.

ACTION:

Identify correct and incorrect instructor behaviors, using the checklist provided.

STANDARD:

1. Correctly identifies correct and incorrect aspects of each of the demonstrations with 90% accuracy.
2. Reach agreement on an objective and practical assessment of instructor skills.

INSTRUCTIONAL TECHNIQUES:

1. Lecture/Discussion
2. Performance/Application

PARTICIPANT MATERIAL:

Instructor Evaluation Checklist

INSTRUCTIONAL MATERIAL:

1. Videotape
2. Television set
3. Videotape recorder

REFERENCES:

TIME:

1.5 to 2 hours

ACTIVITIES:

1. Lecture/Discussion of problems of evaluating instructor performance
2. Group exercise--using evaluation checklist and videotape demonstration of instructor behavior

INSTRUCTIONAL EVENTS

I. EARLY STAGE

Brief lecture/discussion and handout, describing good/bad instructor behaviors.

II. INTERMEDIATE STAGE

Participants view two (2) demonstrations of instructor behaviors (one good and one bad example of demonstration). Using the checklist provided, they will evaluate the demonstration and identify correct/incorrect instructor behaviors.

III. FINAL STAGE

Participants will apply the checklists in evaluating other instructors while they administer a brief practice demonstration.

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	I. Introduction. A. Explain that while a large portion of effective training is the result of the application of sound instructional development procedures (e.g., task analysis), it is also extremely important that developed training is delivered in a manner that will create an atmosphere conducive to learning. In a previous lesson (Lesson 9) we have discussed general classroom techniques which an instructor can use to increase trainee motivation, attention and learning. B. In addition, common instructional techniques can be effectively or ineffectively used. This lesson will focus upon effective and ineffective delivery of the classroom demonstration. II. Development. A. (Note: Parts A and B can be conducted by dividing your class into groups, posing the discussion questions and having each group write their poor/good behaviors their flip charts for total class discussion.) Conduct a discussion focussing upon behaviors exhibited by an instructor while conducting a demonstration which: 1. Decrease student motivation. 2. Decrease student attention. 3. Interfere with learning. The discussion can stem from your instructor's experiences when they were students in high school or college. Keep the discussion focussed upon specific behaviors rather than non-behavioral characteristics (i.e., "the instructor never addressed students by name," rather than "the instructor was distant"). List comments on flip chart or chalk board.	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	B. Once negative instructure behaviors have been listed, ask the class to review each negative behavior and generate a positive instructor behavior which, if practiced, will result in an environment more conducive to student learning.	
	C. Distribute copies of the Instructor Skills Checklist.	Handout 12-1
	D. Compare items on the checklist with those generated during the discussion, and have the class add any new demonstration behaviors to the Checklist.	
	E. Exercise 12-1. Evaluation of Instructor's Demonstration Behaviors	Exercise 12-1
	1. Explain that the class will evaluate the videotape performance of an instructor conducting a demonstration regarding the operation of a film projector.	
	2. Explain that in Part One of the tape, many instructor behaviors are poor, and the class is to use the Checklist and note paper to identify those specific behaviors which result in an instructionally poor demonstration.	
	3. Review your class results with those listed in Part One of the Exercise Answer Sheet.	
	4. Play Part Two of the tape to let the class see how the demonstration has been improved by conducting the discussion attending to the more positive behaviors listed in the Checklist.	
	Note: You may want each of your instructors to conduct a brief demonstration for evaluation by other class members to provide feedback on their demonstration	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	skills. If you should choose this option make sure that:	
	1. Adequate time is allowed for preparation.	
	2. Feedback includes comments about BOTH positive and negative behaviors.	
	3. Feedback is kept on a friendly, constructive level.	
	III. Summary.	
	A. Summarize the lesson by again stressing the importance of positive instructor behaviors in the delivery of classroom demonstration.	
	B. Review those behaviors on the Checklist identified by your class as being the most important behaviors to exhibit while conducting a demonstration.	Handout 12-1

EXERCISE 12-1

Instructor Skills

In this exercise you will be asked to evaluate the delivery of instruction using the demonstration technique. The delivery has been videotaped in two parts. In the first part, the instructor will be exhibiting many negative behaviors which are known to interfere with student learning. During this part, you are to identify the instructor's negative behaivors using the Instructor Skills Checklist provided. Write any additional comments regarding the delivery on the back of the Checklist for discussion following the conclusion of the tape.

EXERCISE 12-1 SUGGESTED ANSWER SHEET
CHECKLIST OF INSTRUCTOR SKILLS: DEMONSTRATION

Instructor: ______________________

Topic: ______________________

Evaluator: ______________________

	RATING				
	Exc.	Good	Adeq.	Poor	Not Observed
DEMONSTRATION CONTENT					
Knowledge of procedures demonstrated.				✓	
Explanation of procedural steps in simple terms.				✓	
Begins with identification of components.				✓	
Sequence of steps is exactly as done on the job.				✓	
Frequently summarizes progress throughout the demonstration.				✓	
Emphasizes critical steps (e.g., dangerous or invalidating).				✓	
Repeats entire procedure to review and summarize.				✓	
INTERACTION WITH STUDENTS					
Puts students at ease; reviews grading system, if applicable.				✓	
Establishes eye contact with all members.			✓		
Encourages active participation through feedback.					✓
Rewards students' comments.				✓	
Encourages questions on procedure being demonstrated.			✓		
Avoids negative non-verbal behaviors.			✓		
Provides student opportunity to demonstrate (if possible).					✓
Asks timely questions of students to check their understanding.				✓	
TEACHING AIDS					
Provides actual or simulated equipment/materials where necessary.	✓				
Clearly visible at all times.				✓	
Sufficient viewing time allowed.				✓	
Aid content coordinated with steps in demonstration.					✓
Unobtrusive equipment operation/handling of aids.			✓		
SPEAKING VOICE					
Clearly audible for entire class.		✓			
Varied voice inflection.		✓			
Understandable vocabulary; no jargon.			✓		
Holds students' attention.			✓		
Evenly paced; neither fast nor slow.		✓			

EXERCISE 12-1

Demonstration: Suggested Answer Sheet (continued)

In addition to the behaviors specified on the Skill Checklist, the instructor was guilty of exhibiting the following behaviors which act to interfere with learning: (Note: Behaviors are listed in the approximate order in which they appear on the tape.)

1. There was no introduction to the components of the projector to provide a necessary frame of reference for the class.
2. The projector already had the arms extended into their correct positions prior to any instruction. If trainees encountered a projector with the arms folded, they would not know how to extend them.
3. The take-up reel and the film were placed on the projector without explaining how this is done (i.e., reels are keyed; and there is a reel lock that must be engaged for proper use).
4. Why and how the end of the leader is to be cut off was not adequately explained.
5. The critical fault of this instruction occured when the instructor demonstrated steps out of sequence. Trainee will not remember which way was correct.
6. Instructions were not detailed. For example, when the switch was turned, there was no mention of the direction it was to be turned or the number of postions on the switch.
7. The instructor frequently blocked the trainee's view while demonstrating specific parts of the projector.
8. The isntructor tried to answer questions over the noise of the projector.
9. The questions asked regarding the numbered places on the projector were very poorly answered.
10. Instructor expressed uncertainty about the irregular motion of the take-up reel.
11. There was no review or summary of the steps required to load the projector.

INSTRUCTIONAL MATERIALS

Lesson 12. Training Delivery: Demonstration

EXERCISE 12-1

Instructor Skills

In this exercise you will be asked to evaluate the delivery of instruction using the demonstration technique. The delivery has been videotaped in two parts. In the first part, the instructor will be exhibiting many negative behaviors which are known to interfere with student learning. During this part, you are to identify the instructor's negative behaviors using the Instructor Skills Checklist provided. Write any additional comments regarding the delivery on the back of the Checklist for discussion following the conclusion of the tape.

HANDOUT 12-1

CHECKLIST OF INSTRUCTOR SKILLS: DEMONSTRATION

Instructor: ______________________________

Topic: ______________________________

Evaluator: ______________________________

	RATING				
	Exc.	Good	Adeq.	Poor	Not Observed
DEMONSTRATION CONTENT					
Knowledge of procedures demonstrated.					
Explanation of procedural steps in simple terms.					
Begins with identification of components.					
Sequence of steps is exactly as done on the job.					
Frequently summarizes progress throughout the demonstration.					
Emphasizes critical steps (e.g., dangerous or invalidating).					
Repeats entire procedure to review and summarize.					
INTERACTION WITH STUDENTS					
Puts students at ease; reviews grading system, if applicable.					
Establishes eye contact with all members.					
Encourages active participation through feedback.					
Rewards students' comments.					
Encourages questions on procedure being demonstrated.					
Avoids negative non-verbal behaviors.					
Provides student opportunity to demonstrate (if possible).					
Asks timely questions of students to check their understanding.					
TEACHING AIDS					
Provides actual or simulated equipment/materials where necessary.					
Clearly visible at all times.					
Sufficient viewing time allowed.					
Aid content coordinated with steps in demonstration.					
Unobtrusive equipment operation/handling of aids.					
SPEAKING VOICE					
Clearly audible for entire class.					
Varied voice inflection.					
Understandable vocabulary; no jargon.					
Holds students' attention.					
Evenly paced; neither fast nor slow.					

LESSON TITLE:

Lesson 13. Training Delivery: Trainee Performance

PURPOSE:

To provide participants a review of the correct and incorrect instructor behaviors when using the instructional method of trainee performance.

TRAINING OBJECTIVE

GIVEN:

1. Good and bad demonstrations of trainee performance.
2. Checklist of instructor behaviors.

ACTION:

Identify correct and incorrect instructor behaviors, using the checklist provided.

STANDARD:

1. Correctly identifies correct and incorrect aspects of each of the demonstrations with 90% accuracy
2. Reach agreement on an objective and practical assessment of instructor skills.

INSTRUCTIONAL TECHNIQUES:

1. Lecture/Discussion
2. Performance/Application

PARTICIPANT MATERIAL:

Instructor Evaluation Checklist

INSTRUCTIONAL MATERIAL:

1. Videotape
2. Television set
3. Videotape recorder

REFERENCES:

TIME:

1.5 to 2 hours

ACTIVITIES:

1. Lecture/Discussion of problems of evaluating instructor performance.
2. Group exercise--using evaluation checklist and videotape demonstration of instructor behavior.

INSTRUCTIONAL EVENTS

I. EARLY STAGE

Brief lecture/discussion and handout, describing good/bad instructor behaviors.

II. INTERMEDIATE STAGE

Participants view two (2) demonstrations of instructor behaviors (one good and one bad example of trainee performance). Using checklist provided, they will evaluate the demonstration and identify correct/incorrect instructor behaviors.

III. FINAL STAGE

Participants will apply the checklist in evaluating other instructors while they administer a brief practice trainee performance exercise.

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	I. Introduction. A. Explain that while a large portion of effective training is the result of the application of sound instructional development procedures (e.g., task analysis), it is also extremely important that developed training is delivered in a manner that will create an atmosphere conducive to learning. In a previous lesson (Lesson 9) we have discussed general classroom techniques which an instructor can use to increase trainee motivation, attention and learning. B. In addition, common instructional techniques can be effectively or ineffectively used. This lesson will focus upon effective and ineffective use of trainee performance as an instructional technique. C. Describe the trainee performance techniques as the situation, typically following some other form of instruction (e.g., demonstration, lecture), when a trainee is to perform a job related task, during which: 1. He/She is to verbally describe the steps of the task as they are being performed. 2. The instructor prevents trainee error (to avoid learning wrong behaviors). 3. The instructor provides positive feedback. II. Development. A. (Note: Parts A and B can be conducted by dividing your class into groups, posing the discussion questions and having each group write their poor/good behaviors on their flip charts for total class discussion.) Conduct a discussion focussing upon behaviors exhibited by an	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	instructor while conducting a trainee performance exercise which:	
	1. Decrease student motivation.	
	2. Decrease student attention.	
	3. Interfere with learning.	
	The discussion can stem from your instructors' experiences when they were students in high school or college. Keep the discussion focussed upon specific behaviors rather than non-behavioral characteristics (i.e., "the instructor never addressed students by name," rather than "the instructor was distant"). List comments on flip chart or chalk board.	
	B. Once negative instructor behaviors have been listed, ask the class to review each negative behavior and generate a positive instructor behavior which, if practiced, will result in an environment more conducive to student learning.	
	C. Distribute copies of the Instructor Skills Checklist.	Handout 13-1
	D. Compare items on the checklist with those generated during the discussion, and have the class add any new performance exercise behaviors to the Checklist:	
	E. Exercise 13-1. Evaluation of Performance Exercise Behaviors.	Exercise 13-1
	1. Explain that the class will evaluate the videotape performance of an instructor conducting a performance exercise regarding the operation of a film projector.	
	2. Explain that in Part One of the tape, many instructor behaviors are poor, and the class is to use the Checklist and note paper to identify those specific behaviors which result in an instructionally poor performance exercise.	

DETAILED LESSON PLAN

Lapsed Time	Instructional Events	Support Materials/Notes
	3. Review your class results with those listed in Part One of the Exercise Answer Sheet.	
	4. Play Part Two of the tape to let the class see how the performance exercise has been improved by conducting the exercise attending to the more positive behaviors listed in the Checklist.	
	Note: You may want each of your instructors to conduct a brief performance exercise presentation for evaluation by other class members to provide feedback on their instructional skills. If you should choose this option make sure that:	
	1. Adequate time is allowed for preparation.	
	2. Feedback includes comments about BOTH positive and negative behaviors.	
	3. Feedback is kept on a friendly, constructive level.	
	III. Summary.	
	A. Summarize the lesson by again stressing the importance of positive instructor behaviors in the trainee performance exercise.	
	B. Review those behaviors on the Checklist identified by your class as being the most important behaviors to exhibit while conducting a trainee performance exercise.	Handout 13-1

EXERCISE 13-1

Instructor Skills

In this exercise you will be asked to evaluate the delivery of instruction using the trainee performance technique. The delivery has been videotaped in two parts. In the first part, the instructor will be exhibiting many negative behaviors which are known to interfere with student learning. During this part, you are to identify the instructor's negative behaviors using the Instructor Skills Checklist provided. Write any additional comments regarding the delivery on the back of the Checklist for discussion following the conclusion of the tape.

EXERCISE 13-1 SUGGESTED ANSWER SHEET
CHECKLIST OF INSTRUCTOR SKILLS:
PERFORMANCE EXERCISE

Instructor: ____________________

Topic: ____________________

Evaluator: ____________________

	RATING				
	Exc.	Good	Adeq.	Poor	Not Observed
PERFORMANCE EXERCISE CONTENT					
Provides clear instructions on performance expected.				✓	
Imposes realistic conditions (time allotted, environment, aids).				✓	
Explains if/when questions are permitted.				✓	
Provides all data/equipment necessary for correct performance.				✓	
INTERACTIONS WITH STUDENTS					
Puts students at ease; reviews grading system, if applicable.				✓	
Establishes eye contact with all students.				✓	
Rewards students correct performances.			✓		
Monitors students throughout exercise period without disruption.				✓	
Aids students who are obviously doing poorly.				✓	
Closes instructional period on time, as originally stipulated.					NA
Collects exercise products without negative comments.					NA
TEACHING AIDS					
Provides actual or simulated equipment/materials where necessary.		✓			
Clearly visible at all times.					NA
Sufficient viewing time allowed.					NA
Aid content coordinated with performance steps.					NA
SPEAKING VOICE					
Clearly audible for entire group.		✓			
Understandable vocabulary; no jargon.		✓			
Gets group's attention when necessary.			✓		
Evenly paced; neither fast nor slow.			✓		

EXERCISE 13-1

Trainee Performance: Suggested Answer Sheet (continued)

In addition to the behaviors specified on the Skill Checklist, the instructor was guilty of exhibiting the following behaviors which act to interfere with learning: (Note: Behaviors are listed in the approximate order in which they appear on the tape.)

1. The instructions given to the class were poor. No time was specified; there was no indication as to whether this was a test situation or whether questions were allowed, etc.

2. The trainee should have been instructed to verbally explain each step as it was taken and to indicate why specific steps were taken.

3. The instructor did not act to prevent errors. The primary purpose of this technique is to permit trainees to practice behaviors without error so that proper skills are developed.

4. All the materials needed were not immediately available. The trainee had to ask for the take-up reel.

5. The instructor failed to answer questions adequately and played a guessing game with the trainee. This is not an effective learning atmosphere.

6. The instructor was somewhat sarcastic with comments like "You were lucky the machine did not jump." This is also not an effective learning atmosphere.

7. There was little eye contact with the trainee or the class.

8. There was little effective feedback provided to the trainee at the end of the exercise.

9. There was no summary to the exercise.

INSTRUCTIONAL MATERIALS

Lesson 13. Training Delivery: Trainee Performance

EXERCISE 13-1

Instructor Skills

In this exercise you will be asked to evaluate the delivery of instruction using the trainee performance technique. The delivery has been videotaped in two parts. In the first part, the instructor will be exhibiting many negative behaviors which are known to interfere with student learning. During this part, you are to identify the instructor's negative behaviors using the Instructor Skills Checklist provided. Write any additional comments regarding the delivery on the back of the Checklist for discussion following the conclusion of the tape.

HANDOUT 13-1
CHECKLIST OF INSTRUCTOR SKILLS: PERFORMANCE EXERCISE

Instructor: ______________________

Topic: ______________________

Evaluator: ______________________

	RATING				
	Exc.	Good	Adeq.	Poor	Not Observed
PERFORMANCE EXERCISE CONTENT					
Provides clear instructions on performance expected.					
Imposes realistic conditions (time allotted, environment, aids).					
Explains if/when questions are permitted.					
Provides all data/equipment necessary for correct performance.					
INTERACTIONS WITH STUDENTS					
Puts students at ease; reviews grading system, if applicable.					
Establishes eye contact with all students.					
Rewards students correct performances.					
Monitors students throughout exercise period without disruption.					
Aids students who are obviously doing poorly.					
Closes instructional period on time, as originally stipulated.					
Collects exercise products without negative comments.					
TEACHING AIDS					
Provides actual or simulated equipment/materials where necessary.					
Clearly visible at all times.					
Sufficient viewing time allowed.					
Aid content coordinated with performance steps.					
SPEAKING VOICE					
Clearly audible for entire group.					
Understandable vocabulary; no jargon.					
Gets group's attention when necessary.					
Evenly paced; neither fast nor slow.					

APPENDIX A

INSTRUCTOR QUESTIONNAIRE

Instructor Questionnaire

Directions: The following questions are aimed at finding out what you know about the procedures involved in systematically developing and presenting a training course. The results will be used only to make decisions about the content of a planned seminar for instructors of water plant operators. Read each item carefully and write your answer in the space provided. Please state your answers as briefly as possible.

1. In one or two sentence, describe a situation in your area that suggests a need for water plant operator training.

____

____

____

2. What are the two general steps performed when conducting a task analysis?

a. ____

____

b. ____

____

3. A good training objective is comprised of three parts. What are they?

a. ____

____

b. ____

____

c. ____

____

____

4. Write a good training objective to reflect the operator task of "Conduct a chlorine residual test."

____

____

____

____

____

5. Describe two general guidelines that should be used in sequencing instructional activities to optimize learning.

a. ____

____

b. ____

____

6. In general, learning is fastest when: [Check (✓) all that apply.]

_____ Training activities do not require the trainee to respond.

_____ Visual aids are kept to a minimum.

_____ Test results are reviewed no earlier than one week after a test.

_____ Activities are directly job related.

_____ Only one instructional method is used throughout a course.

7. An instructor lecture is most appropriate for which stage of trainee learning? [Check (✓) your answer.)

_____ Early stage.

_____ Middle stage.

_____ Final stage.

8. Which of the media categories below would be most helpful in training an operator to replace a valve seal. [Check (✓) your answer.]

_____ Programmed instruction.

_____ Instructor demonstration.

_____ Textbook description.

_____ Training film.

9. The U.S. EPA has developed nationally applicable training programs in which of the following areas? [Check (✓) your answers.]

_____ Water plant operator training.

_____ The procedures for administering requests for variances and exemptions.

_____ Water plant maintenance training.

_____ Testing for chlorine residual and turbidity.

_____ Water plant supervisor management training.

10. If you develop instructor lesson plans for a training course for which you will NOT be the instructor, the lesson plans should: [Check (✓) your answers.]

_____ be in outline form.

_____ include specific questions to be asked.

_____ specify the technical content of the lesson.

_____ indicate page numbers of referenced trainee materials.

11. List two types of information that you MUST have before you can determine what the training content of a course will be:

a. ____

b. ____

____

12. The most appropriate test form for assessing knowledge of states and their capitals is:

_____ True-False.

_____ Multiple-choice.

_____ Essay.

_____ Matching.

_____ Short Answer.

13. Which True-False question below is written in the best form? [Check (✓) your answer.]

_____ Water always freezes at 32°.

_____ The MCLs for arsenic and chromium are 0.07 and 0.045 respectively.

_____ A molecule of water is heavier than a molecule of salt.

_____ Lead service lines never cause water to exceed the allowable MCL.

14. How would you rate your confidence in your ability to: [Check (✓) the number that indicates your degree of confidence.]

	VERY CONFIDENT					LITTLE OR NO CONFIDENCE
	1	2	3	4	5	6
a. Identify good and poor audiovisual materials.						
b. Prepare audiovisual materials that meet the criteria for good design.						
c. Obtain resources contained in IRIS.						
d. Obtain resources contained in IRC.						
e. Conduct an instructional lecture.						
f. Recognize and specify instructor behaviors which characterize a good instructional lecture.						
g. Conduct a group discussion.						

15. (continued)

	VERY CONFIDENT 1	2	3	4	5	LITTLE OR NO CONFIDENCE 6
h. Recognize and specify instructor behaviors which create a good group discussion.						
i. Conduct an instructional demonstration.						
j. Recognize and specify instructor behaviors which characterize a good instructional demonstration.						
k. Conduct a performance exercise.						
l. Recognize and specify instructor behaviors which create a good performance exercise.						

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